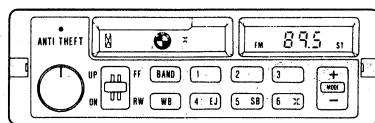


# Service Manual


**ORDER NO.  
CRT 1153**
**BMW ANTI-THEFT CD-READY RADIO**

# KE-83ZBM

**US**
**Note :**

- See the separate manual CX-156 (CRT-468) for the cassette mechanism description.
- Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

BMW No. 88 88 1 600 183

## SPECIFICATIONS

**TUNER**
**FM Receiver**

Usable Sensitivity (Load)

 1  $\mu$ V

[30 dB (N + D)/(S + N + D)]

Signal/Noise Ratio (1 mV)

65 dB

Overload Signal

1 V

AM Rejection

40 dB

IF Rejection

100 dB

Image Rejection

50 dB

Spurious Rejection

70 dB

Alternate Channel Selectivity

60 dB

Capture Ratio

2 dB

Stereo Separation (1 kHz)

40 dB

Stereo Distortion (1 mV)

0.5%

Frequency Range

87.9 to 107.9 MHz

Intermediate Frequency

10.7 MHz

**AM Receiver**

Usable Sensitivity

 10  $\mu$ V

[20 dB N(S + N)]

Signal/Noise Ratio (5 mV)

50 dB

 Selectivity ( $\pm 10$  kHz)

100 dB

IF Rejection

100 dB

Image Rejection

60 dB

Distortion (5 mVRF)

0.5%

Frequency Range

530 to 1620 kHz

Intermediate Frequency

450 kHz

**WB Receiver**

Usable Sensitivity (Load)

 0.3  $\mu$ V

[20 dB (S + N)/(S + N + D)]

Signal/Noise Ratio (1 mV)

55 dB

Distortion

1.5%

Frequency Range

162.400 to 162.550 MHz

(25 kHz Step)

Intermediate Frequency

10.7 MHz

1st I.F

450 kHz

2nd I.F

**Cassette Deck**

Wow and Flutter WRMS — JIS

0.07%

Signal/Noise Ratio

50 dB

Dolby NR Effect

10 dB

Separation

50 dB

Cross Talk

55 dB

Distortion

1%

Frequency Response (-3 dB)

40 Hz to 15 kHz

Normal

40 Hz to 18 kHz

Metal

**Audio Control**

Tone Control Response

 $\pm 10$  dB

Treble Boost/Cut

10 kHz

Bass Boost/Cut

100 Hz

**Power Amplifier**

 Power Output ( $R_L = 4 \Omega$ ,  $V_{cc} = 14.4$  V)

5.5 W/Ch

10% THD

4.5 W/Ch

1% THD

 THD ( $R_L = 4 \Omega$ ,  $V_{cc} = 14.4$  V)

0.7%

 $P_o = 1$  W

Frequency Response

20 Hz to 40 kHz

 ( $\pm 3$  dB)

Signal/Noise Ratio

65 dB

NOTE: Specifications are subject to change without notice.

**PIONEER ELECTRONIC CORPORATION**

4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

**PIONEER ELECTRONICS SERVICE INC.** P.O. Box 1760, Long Beach, California 90801 U.S.A.

**PIONEER ELECTRONICS OF CANADA, INC.** 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada

**PIONEER ELECTRONIC [EUROPE] N.V.** Keetberglaan 1, 2740 Beveren, Belgium

**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.** 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

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## 1. PROTECT YOUR RADIO FROM THEFT

Your BMW radio will not operate once it is removed from the console, making it virtually useless to a thief. The only way to restore power to the radio once it is removed is to enter a five-digit security code unique to your radio. The anti-theft features of your radio operate as follows:

1. When the ignition key is removed, the red anti-theft LED indicator will flash continuously.
2. If any buttons on the radio are touched after the key is removed, a warning tone will sound for five minutes or until the ignition is turned on. The anti-theft indicator will also flash.
3. A dead battery, electrical repairs, radio removal or reduction of voltage supply to less than a preset value will render the radio inoperable until voltage is restored and the security code is entered. The radio must be turned on before the code is entered. The word "code" will show on the display.
4. To enter your security code, which can be found on the two cards supplied to you by BMW, turn the radio on and use the appropriately numbered radio push-button selectors.

If the correct code is not entered in three successive tries, the radio will not accept another entry until it has been left on for one hour.

5. Do not leave the code cards in your car. Place them in your wallet or with your vehicle title papers for security. If you lose the code cards, contact the nearest BMW dealer. He will get your code from BMW. There may be a charge for removing the radio to ascertain its chassis number.

6. If radio or electrical repairs become necessary, please give the repair facility your radio code number. If you do not, only authorized BMW personnel can obtain the code from BMW.

**Important:** If you make a mistake in entering your code, complete the entire sequence before entering the correct code. For example, if your code is 12345, and you mistakenly enter 125, finish the five-digit sequence (45) to complete that entry. The radio will not operate, and the word "code" will again appear on the display. Enter the correct code at this time.

**Exception:** If you hear a beep when entering your code, stop immediately! Begin entering the code again, starting with the first digit.

**WARNING: FOR YOUR PROTECTION, CODES WILL NOT BE GIVEN OUT TO ANYONE—UNDER ANY CIRCUMSTANCES—EXCEPT AUTHORIZED BMW DEALER PERSONNEL AFTER PROOF OF VEHICLE OWNERSHIP AND PROPER IDENTIFICATION IS ESTABLISHED.**

## 2. USING THE RADIO

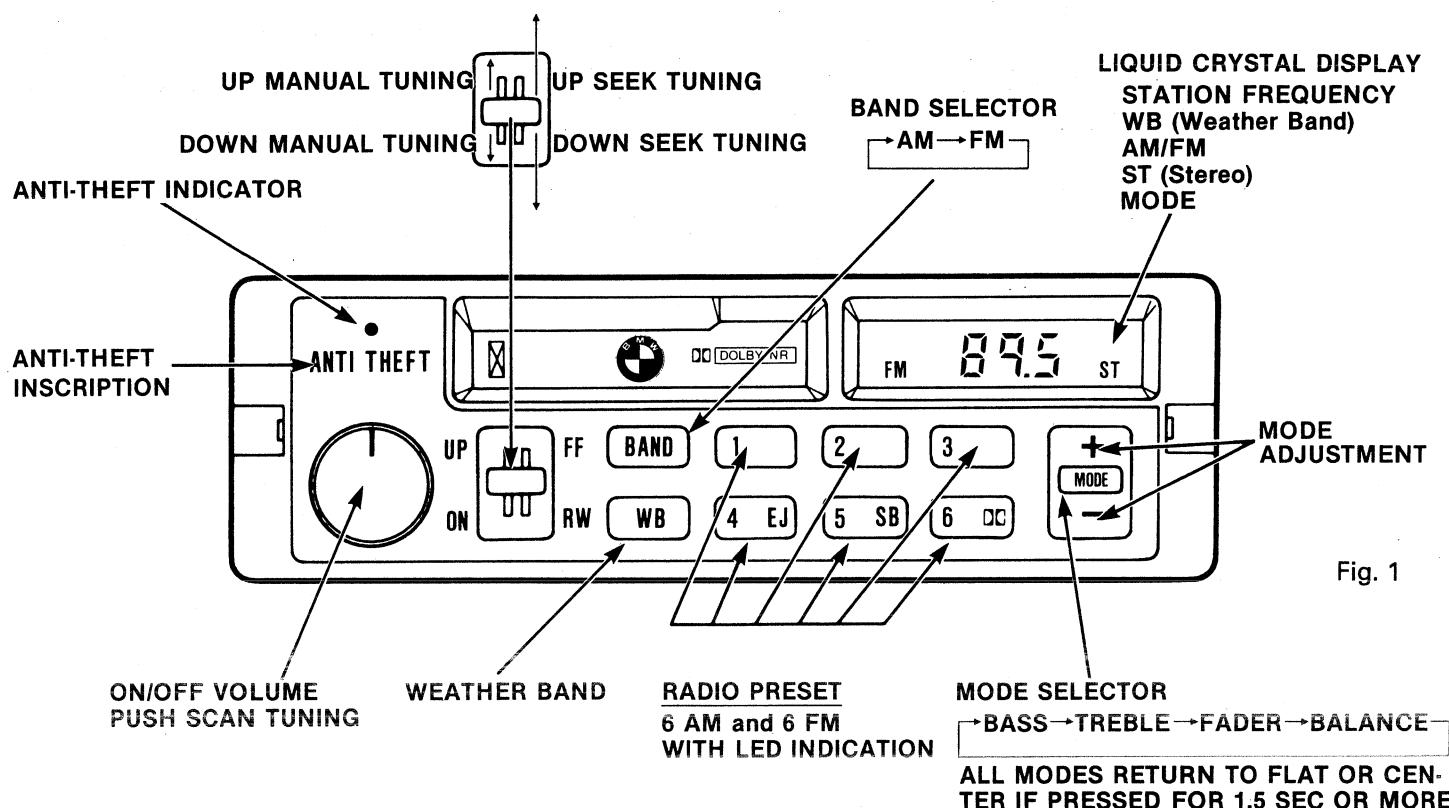


Fig. 1

### AM/FM

Press the BAND button and AM or FM will appear on the display indicating which band is being received. When AM or FM is chosen, the currently tuned frequency is also displayed. Press the button to change from band to band.

### WEATHER BAND (WB) AUTOMATIC FREQUENCY SELECTION

When the WB button is pressed, regardless of what source you are currently listening to, weather band seek tuning begins automatically and finds the strongest broadcast frequency. If the broadcast frequency in your area is too weak, or nonexistent, a beep will sound after the WB frequencies have been run through three times. If you press the WB button again, the radio returns to the previous source.

### AUTOMATIC LOCAL/DISTANCE SWITCHING

New electronic circuitry automatically selects the local/distance mode for best reception, eliminating the need for manual switching.

### MANUAL/SEEK TUNING

The TUNING LEVER is used for both manual and seek tuning. For manual tuning, raise or lower the lever one step—up for higher frequencies, down for lower frequencies. For seek tuning, raise or lower the lever as far as it will go. The unit will automatically tune and lock onto the next higher or lower receivable broadcast frequency.

### STEREO

The ST indicator will light up on the display whenever a stereo station is received. The indicator will flash when signal strength diminishes.

### PRESET STATION INDICATORS WITH LED

Each PRESET button has a built-in LED. When a PRESET button is pushed, the LED will change from orange to green, indicating selection of that preset frequency.

**SCAN TUNING**

Signal scan tuning allows you to tune into each medium-to-strong frequency pausing seven seconds at each. Push the ON/OFF button once to begin tuning up scale, and press it again during a pause to stop the scanning.

**FM RECEPTION**

Signal reflections or blockages caused by hills or tall buildings may cause hissing and fluttering noises in FM reception. FM signal strength diminishes beyond 25 miles from the transmitter.

**BASS, TREBLE, FADER AND BALANCE CONTROL**

Each time the MODE button is pressed, control of bass, treble, fader, or balance is selected in turn. The selected mode is shown on the display and can be adjusted by the + and - buttons. About five seconds after adjustment, the display returns to its previous state.

When the MODE button is pressed continuously for more than 1.5 seconds, the level of each mode returns to flat or center. At this time a beep is sounded and "FLAT" is displayed on the display.

**PROGRAMMING/REPROGRAMMING PRESET STATIONS**

Tune in the desired radio station. Then push a PRESET selection button for 1.5 seconds. When you hear a beep, the frequency has been memorized. Repeat this procedure for the remaining preset station selectors on the AM and FM bands.

**NOTE:** The radio programming controls have dual functions. Each button can be set to one AM and one FM station.

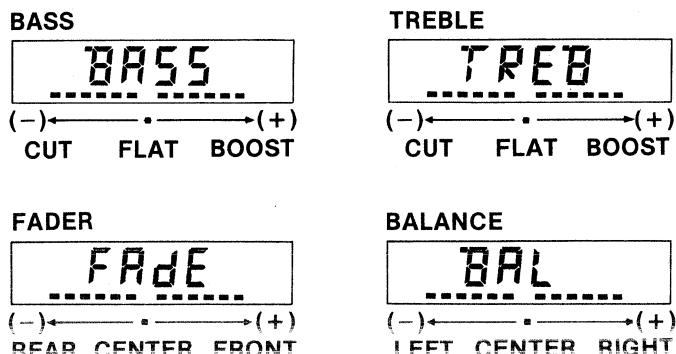
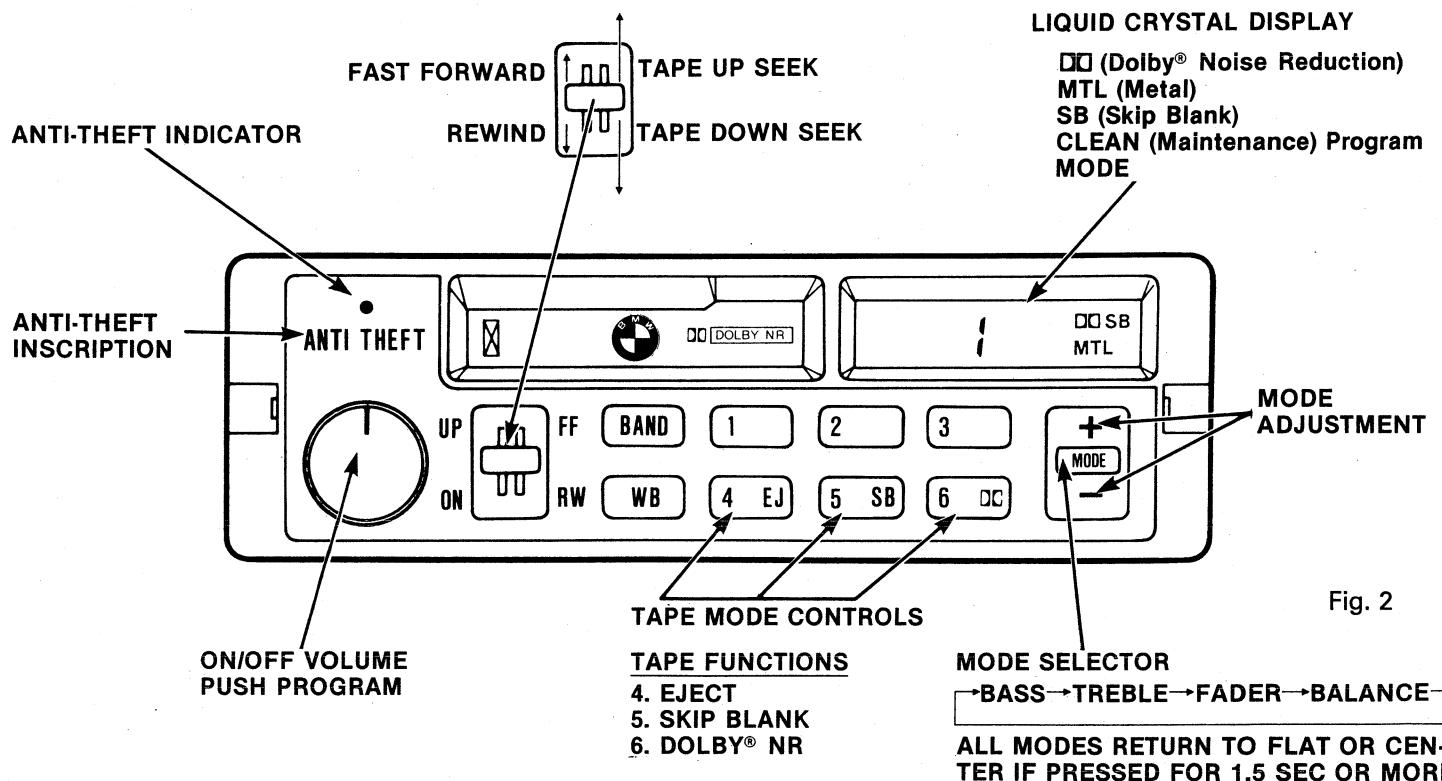
**3. USING THE TAPE DECK**

Fig. 2

**CASSETTE OPERATION**

To use the cassette player, turn the radio on. When a cassette is inserted, the unit will switch automatically from radio to tape mode.

**FAST FORWARD/REWIND**

The FF/RW lever has a two-step operation. Raise the lever one step to fast forward; lower it one step to rewind. Repeat the same action to stop the appropriate function. The logic circuitry in your radio will automatically determine the right direction for fast forward or rewind.

A standard cassette has two sides and can be played in either direction. When in play, the top side of a cassette will be indicated as "1" on the display. The bottom side will appear as "2".

**TAPE SEEK**

Raising or lowering the fast forward/rewind (FF/RW) lever two steps (as far as it can go) activates the seek mode. SEEK will appear on the display. To move to the next selection on your tape, raise the lever as far as it can go. The tape will move rapidly to the next selection. To restart the current selection, lower the lever in the same fashion.

**TAPE EJECT (4 EJ)**

Press the EJECT button—4 EJ to eject tape cassette and return to the radio mode.

**SKIP BLANK (5 SB)**

The SKIP BLANK button—5 SB—automatically advances the tape to the next recorded portion when a blank section of tape exceeds approximately 12 seconds. When there is a long, unrecorded portion at the end of the tape, the unit advances the tape to the end and then starts to play the other side. When the SKIP BLANK button is pushed, SB will appear on the display. Additionally, SEEK will be displayed while the tape is advancing.

**DOLBY® NOISE REDUCTION (6 D)**

Use the Dolby®\* Noise Reduction function—button 6 D—to reduce the level of hiss on Dolby® encoded cassettes. If you do not use the Dolby® noise-reduction function with Dolby® encoded tapes, the high-frequency response will be intensified. If you do use this function with non-Dolby® tapes, high-frequency response will be diminished.

\*The word "Dolby" and the double-D symbol are registered trademarks of Dolby Laboratories, Inc.

Tape Seek will only function correctly if there are four seconds of silence between the selections on your tape. Excessive noise between selections on home-recorded tapes may interfere with these functions.

The cassette automatically ejects from the unit if tape setting operations cannot be completed within a few seconds. This may be caused by a faulty or damaged cassette. Determine the cause of the problem or use a different cassette.

**REVERSING TAPE DIRECTION**

To reverse tape direction, push the ON/OFF button. The tape will reverse automatically when a side is complete.

**AUTOMATIC EQUALIZATION**

The playback equalization of normal tapes differs from that of chrome and metal tapes. When a high-bias tape, including metal, is inserted, the unit will automatically change to the correct equalization level, and MTL will be indicated on the display.

**IGNITION-KEY-OFF PAUSE MODE**

If the ignition is turned off while a tape is playing, the unit automatically enters the pause mode. The unit will return to normal play mode when the ignition is turned on. The unit will not accept another cassette when it is in the pause mode.

**AUTOMATIC TAPE SLACK CANCELLER (ATSC)**

The automatic tape slack canceller removes any slack in the tape before play to protect the tape and extend its life.

**ROTATING TAPE HEAD**

The rotating tape head in your tape cassette player ensures accurate horizontal tape alignment in both directions for optimum sound level reproduction and frequency response.

**NOTE:** The BMW Anti-Theft Radio contains a full-logic computer-controlled 3-motor drive which controls the automatic tape slack canceller (ATSC) and rotating tape head mechanism. During cassette tape loading/unloading or tape transport directional changes, the motor drive emits a precision mechanical sound which indicates normal tape cassette player operation.

## 4. DISASSEMBLY

### ● Removing the Case

1. Remove the screw (A).
2. Insert and turn a flat screwdriver to remove case.
3. Raise case to remove.

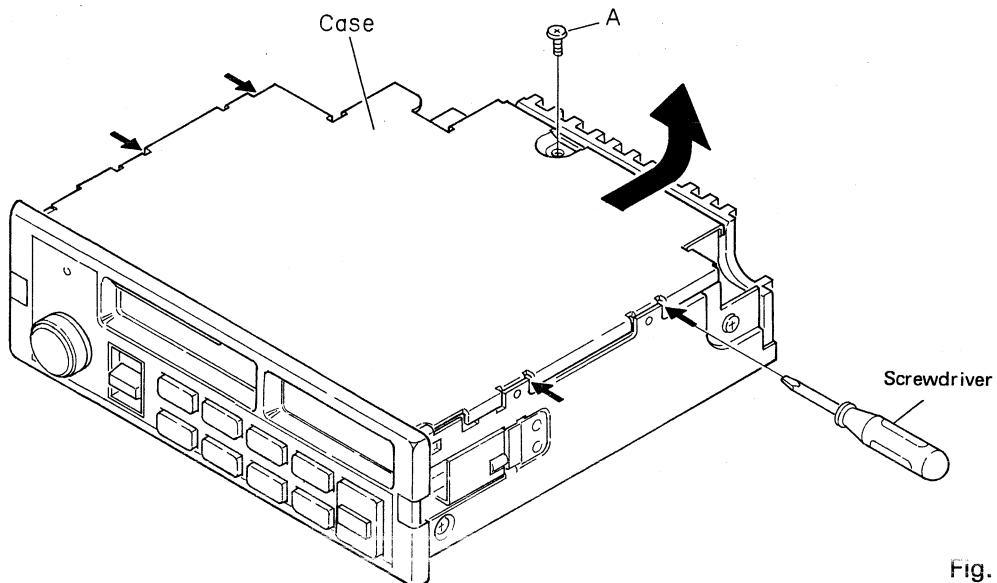


Fig. 3

### ● Removing the Cassette Mechanism Assy

1. Remove the four screws (B)
2. Pull the connector (20P) out while Lifting the Cassette Mechanism Assy straight up.

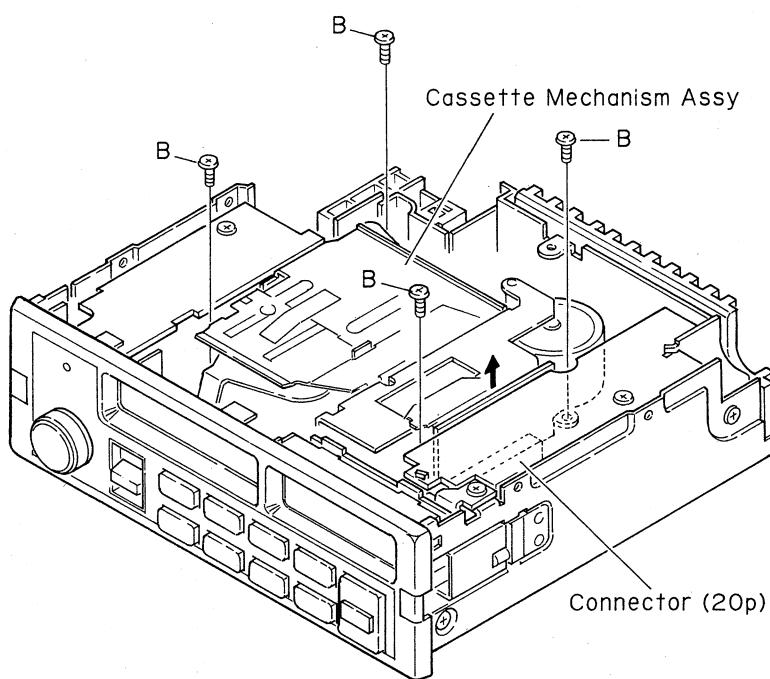


Fig. 4

### ● Removing the Grille Assy

1. Remove the two knobs, and remove the two screws (c).
2. Insert a screwdriver and turn it in the arrow direction, then two connector catches come off and the flexible circuit board can be removed.
3. Remove the two tabs.

### ● Removing the Tuner Amp Unit (4/6)

1. Remove the screw (E).
2. Remove the solder, and stretch the tab.
3. Pull the connector (10P) out while Lifting the Tuner Amp Unit (4/6) straight up.

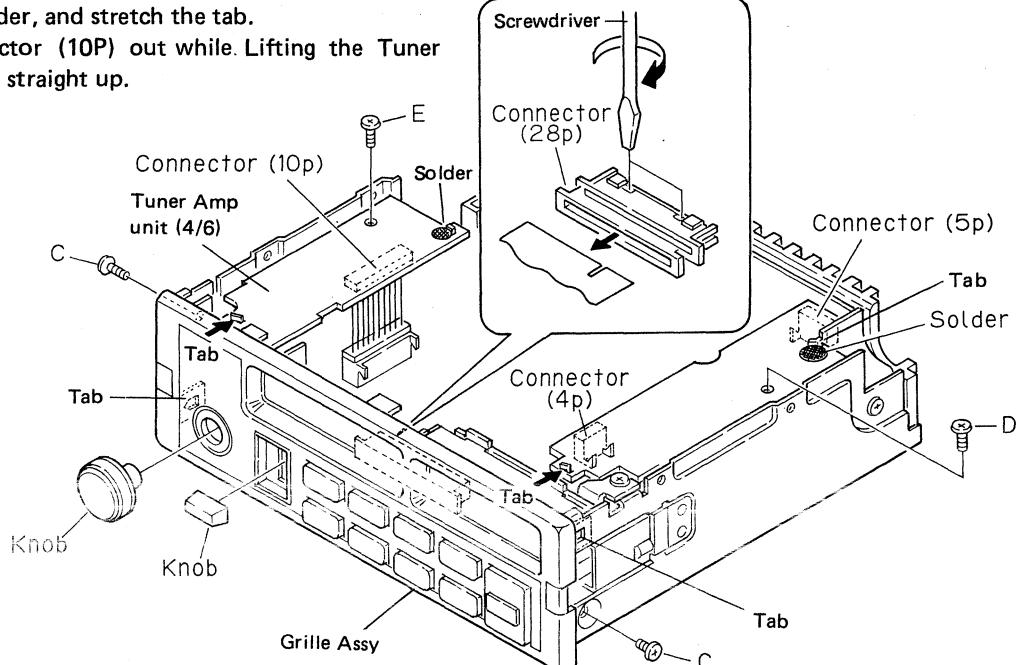


Fig. 5

### ● Removing the LCD Unit

1. Remove the screw (F).
2. Pull the connector (16P) out while Lifting the LCD Unit straight up.

### ● Removing the Tuner Amp Unit (1/6)

1. Remove the screw (D).
2. Remove the solder, and stretch the two tabs.
3. Pull the connectors (4P, 5P) out while Lifting the Tuner Amp Unit (1/6) straight up.

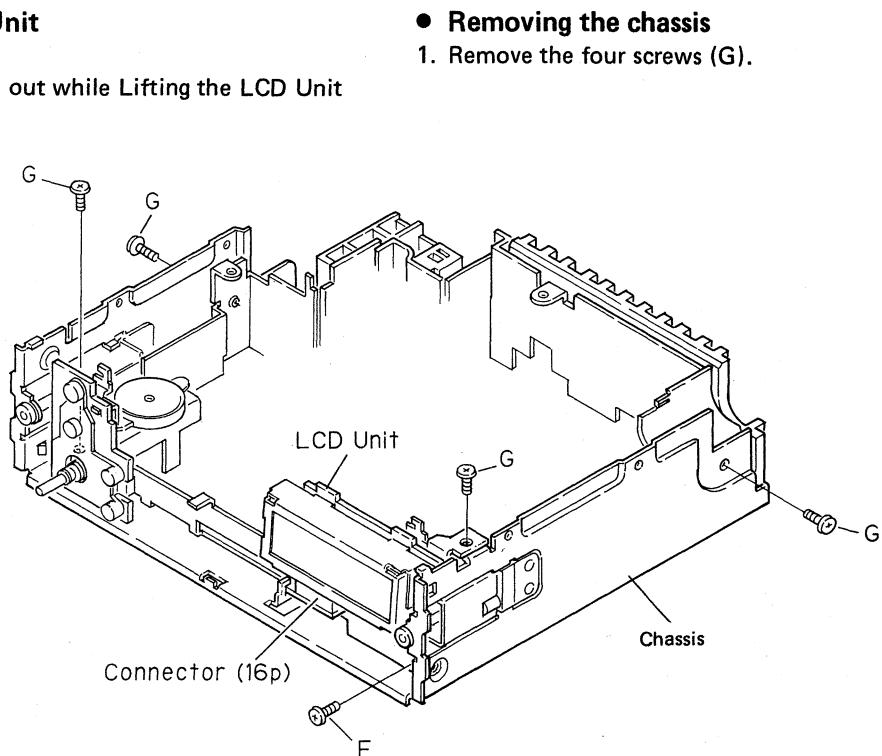


Fig. 6

## 5. CONNECTOR TERMINAL FUNCTIONS

- Connection Diagram

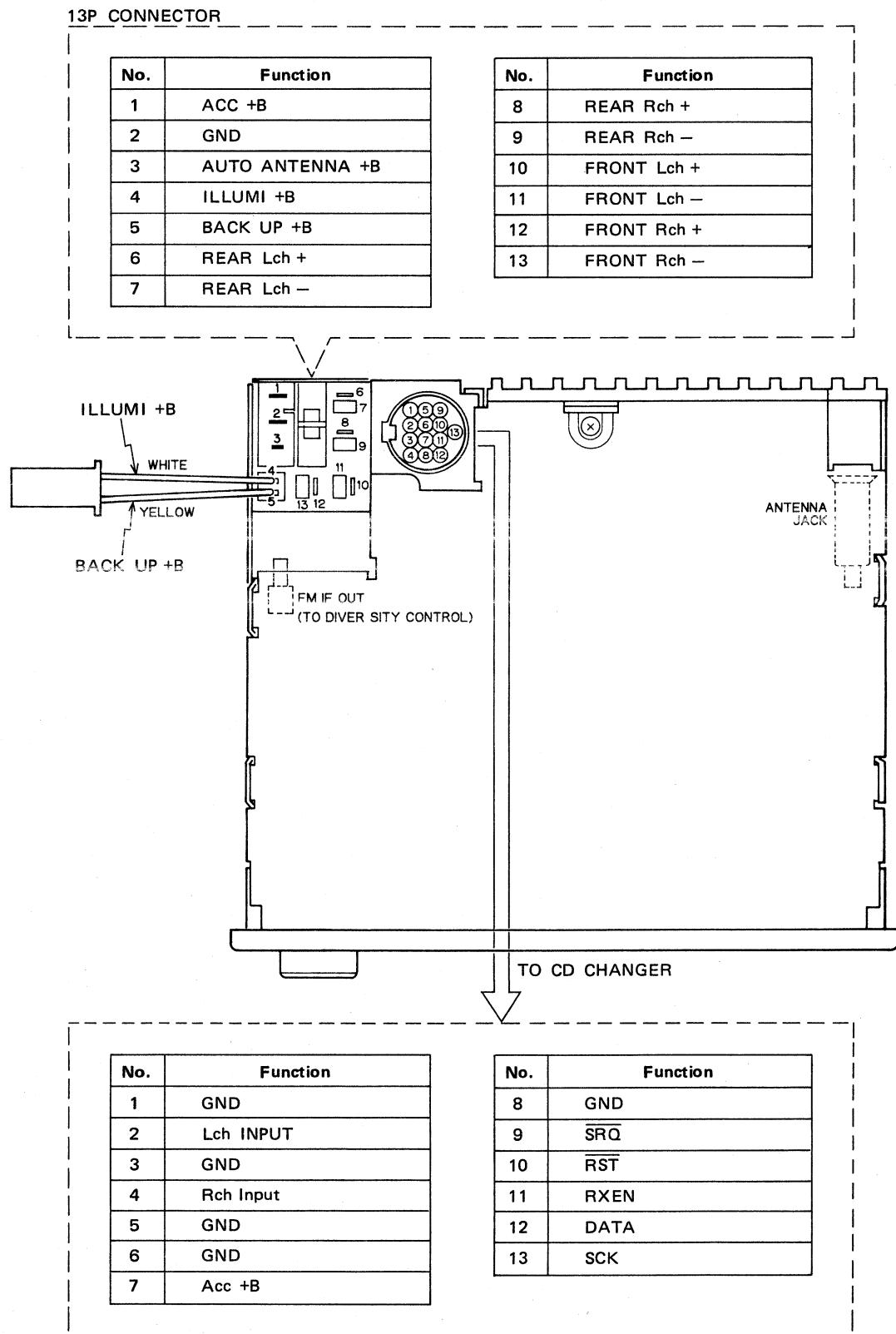
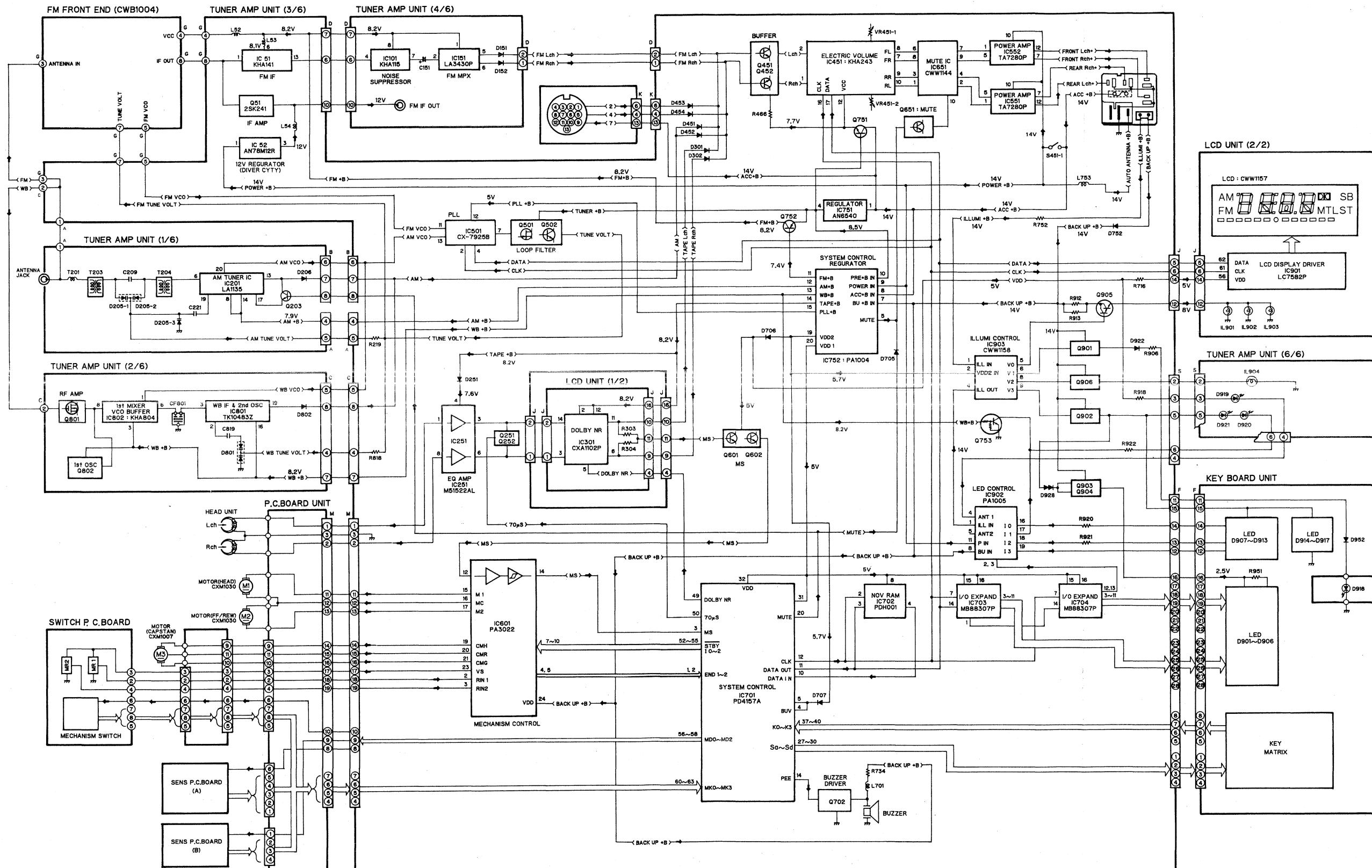


Fig. 7

## 6. BLOCK DIAGRAM



## 7. ADJUSTMENT

### ● Connection Diagram

#### NOTICE:

Select C1 so that total capacity of 80pF attained from the direction of the receiver jack.  
Z: Output impedance of SSG.

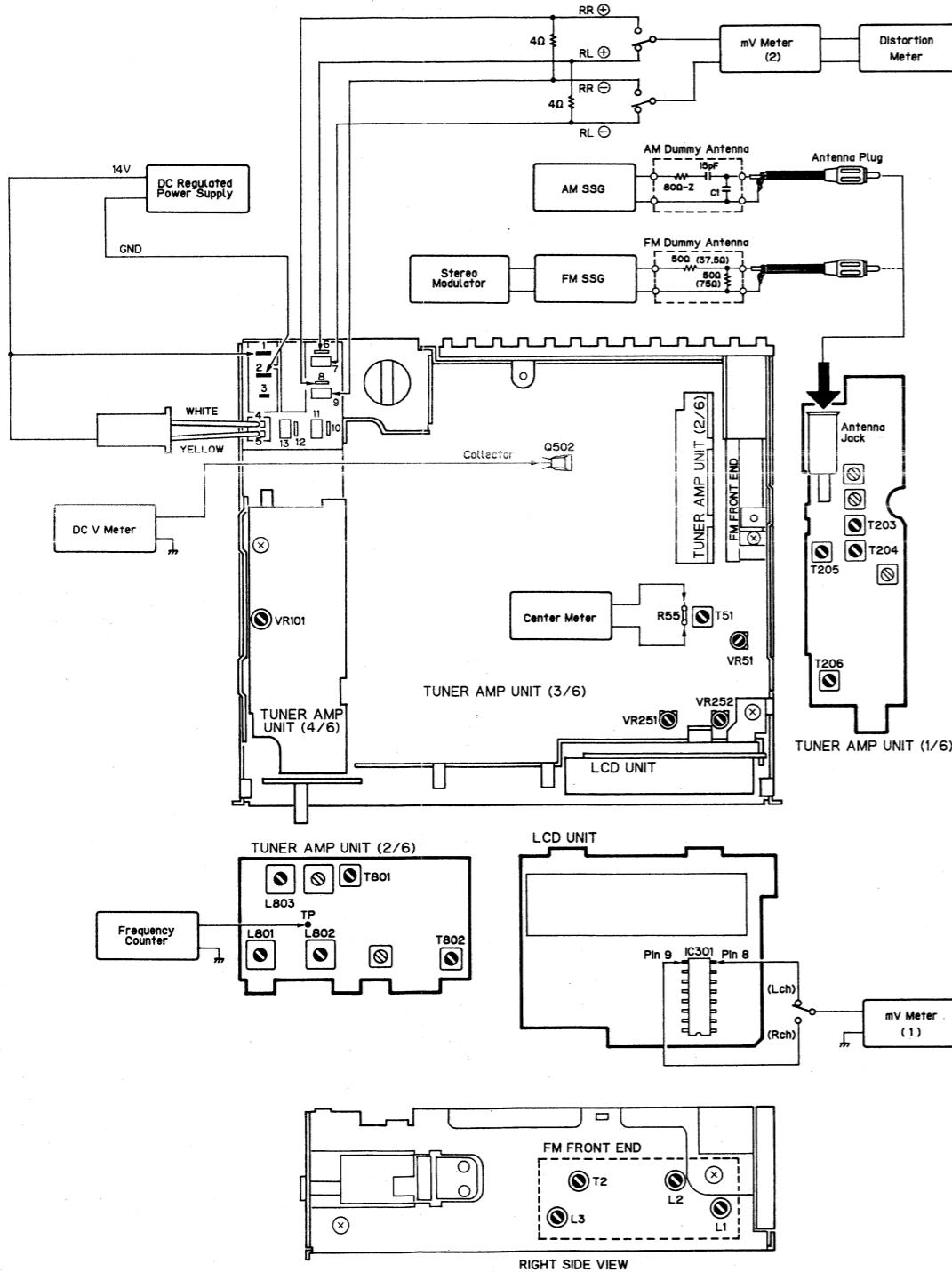


Fig. 9

### 7. 1 DOLBY NR LEVEL ADJUSTMENT

No.	Cassette Tape	Adjusting Point	Adjustment Method (Switch Position)
1	NCT-150 (400Hz, 200nwb/m)	VR251(Lch), VR252(Rch)	mV Meter (1): 245mV ± 1dB (245mV = -10dBs) (DOLBY NR Switch: OFF)

### 7. 2 AM ADJUSTMENT

	No.	AM SSG (400Hz, 30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (kHz)	Level (dB)			
Tuning Volt	1			1,620	—	DC V Meter: Less than 8.0V
	2			530	—	DC V Meter: More than 0.8V
Tracking	1	600	20	600	T203, T204, T205, T206	mV Meter (2): Maximum
	2	600 1,000 1,400	35	600 1,000 1,400	—	The difference between the maximum and minimum output levels at 600kHz, 1,000kHz and 1,400kHz must be 6dB or less.

### 7. 3 FM ADJUSTMENT

※ Stereo MOD.: 1kHz, L+R = 90%, Pilot = 10%

	No.	FM SSG (400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (MHz)	Level (dB)			
IF	1	98.1 Unmodulated	60	98.1	T51	Center Meter: 0
Tracking	1	107.9	10	107.9	L3	DC V Meter: 7.0V ± 0.1V
	2	87.9	10	87.9	—	DC V Meter: More than 1.5V
	3	90.1	10	90.1	L1, L2	mV Meter (2): Maximum
	4	98.1	10	98.1	T2	mV Meter (2): Maximum
MPX	1	98.1※	60	98.1	VR101	mV Meter (2): Best separation
ARC	1	98.1※	35	98.1	VR51	mV Meter (2): Separation 5dB

## 7. 4 WB ADJUSTMENT

No.	FM SSG(400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
	Frequency (MHz)	Level (dB)			
WB	1		CH-3/WB	L803	Frequency Counter: 151.775MHz NOTE: After adjusting L803, disconnect frequency counter
	2	162.400	60	CH-2/WB	mV Meter(2):10dBs
	3	162.400	60	CH-2/WB	Distortion Meter:Minimum
	4	162.475	10-15	CH-3/WB	mV Meter(2):Maximum
	5	162.475	10-15	CH-3/WB	mV Meter(2):Maximum

## 8. INNER CONNECTIONS OF LCD (CWW 1157)

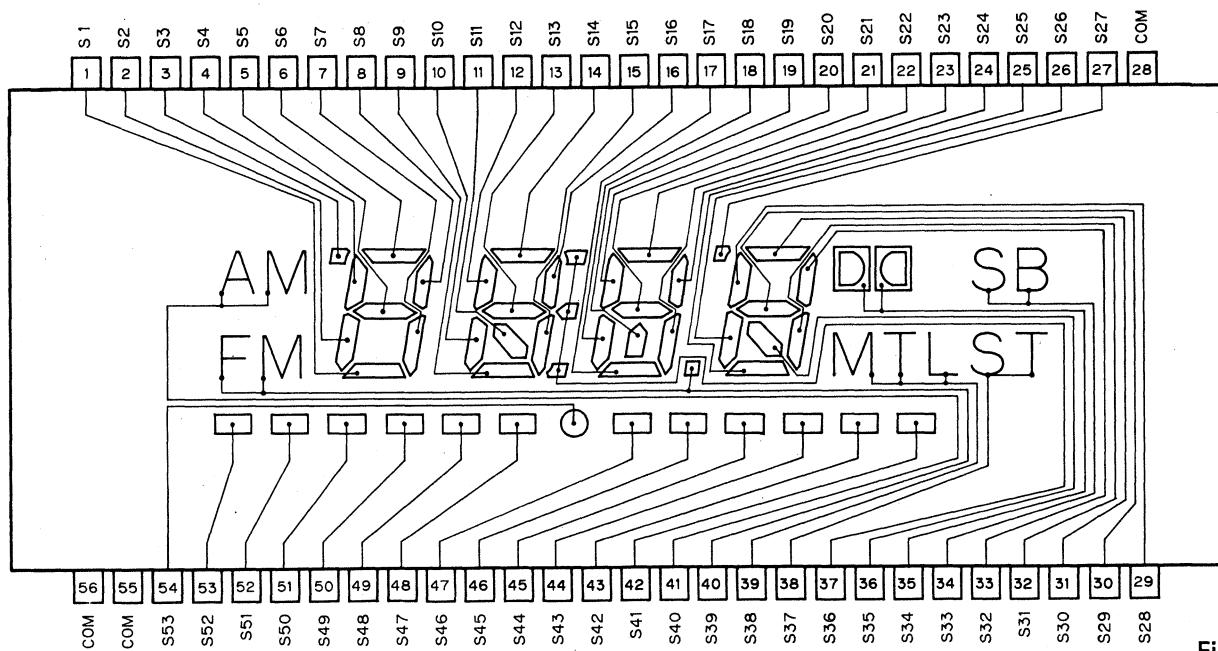
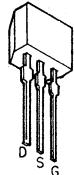


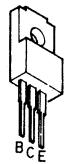
Fig. 10

● ICs and Transistors

2SK241



2SD1276



2SC2753  
2SC2570



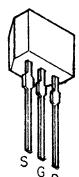
2SK435



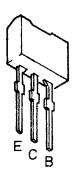
2SC2458  
2SC1740S  
2SB808



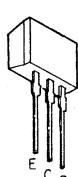
2SK330



2SC3665



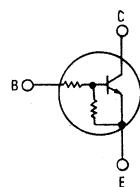
2SC2786



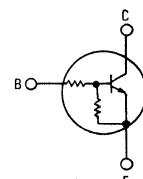
2SD1930



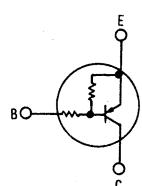
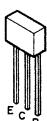
UN4212



DTC124ES

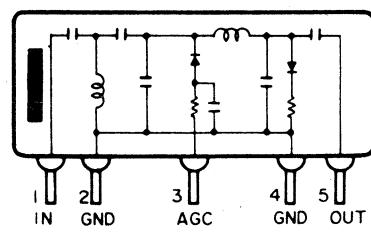


DTA144ES

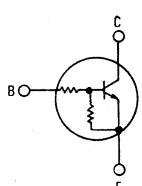
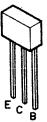


● FM Front End

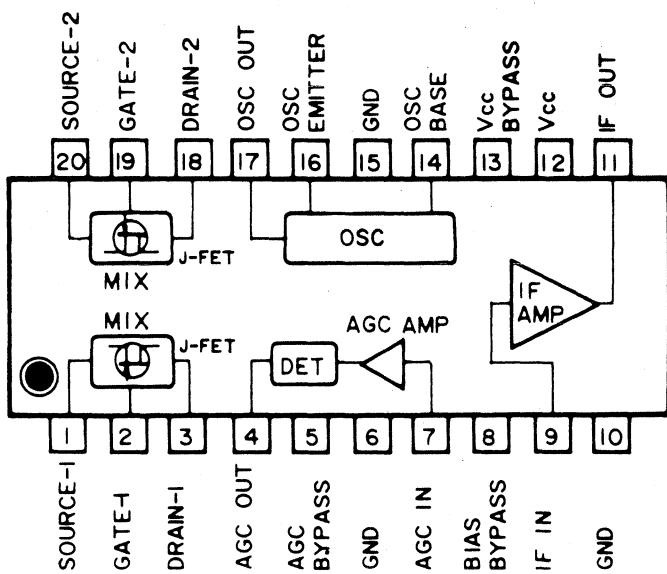
IC1: CWW1015  
(CWW-173)



UN4113

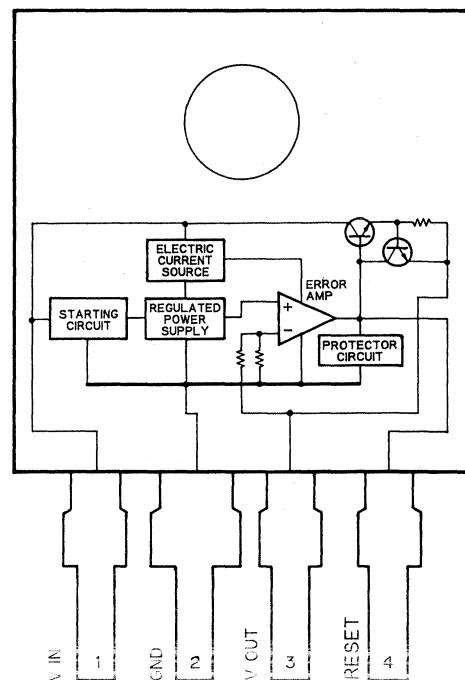


IC2: PA4009

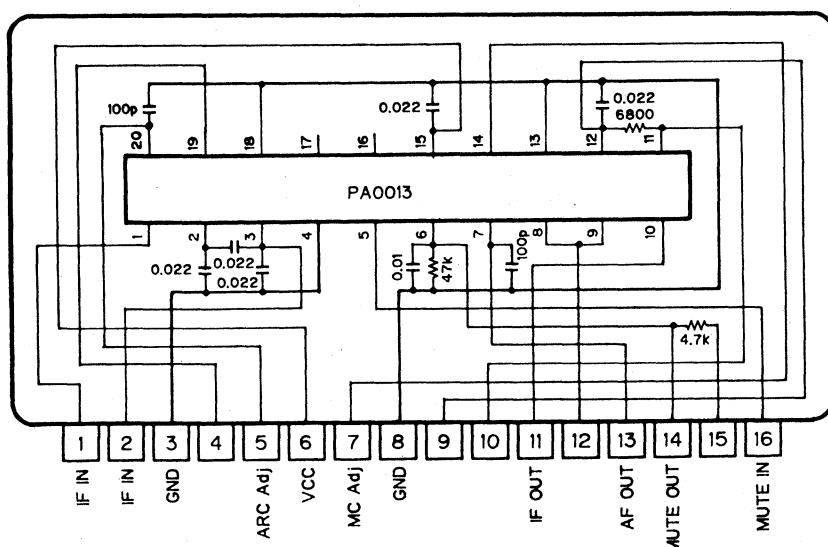


- Tuner Amp Unit

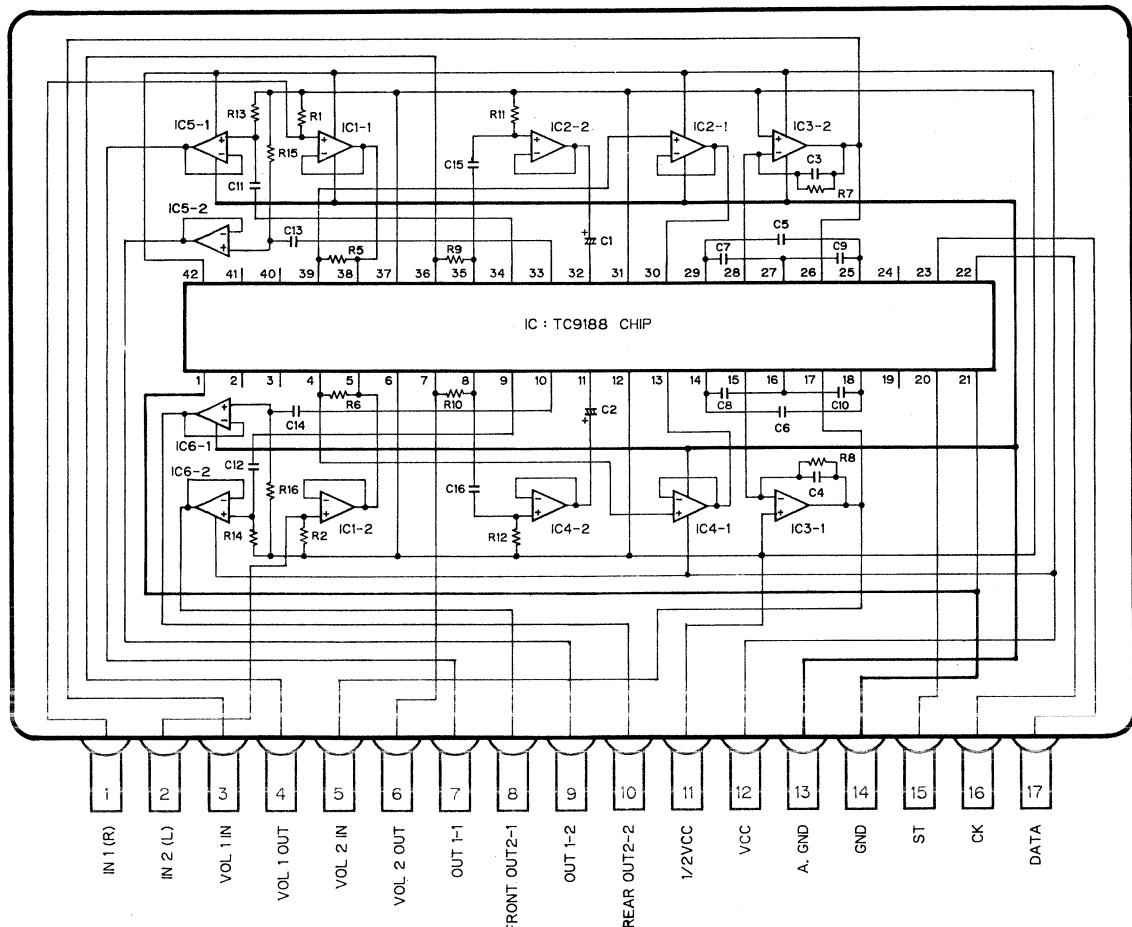
IC52: AN78M12R



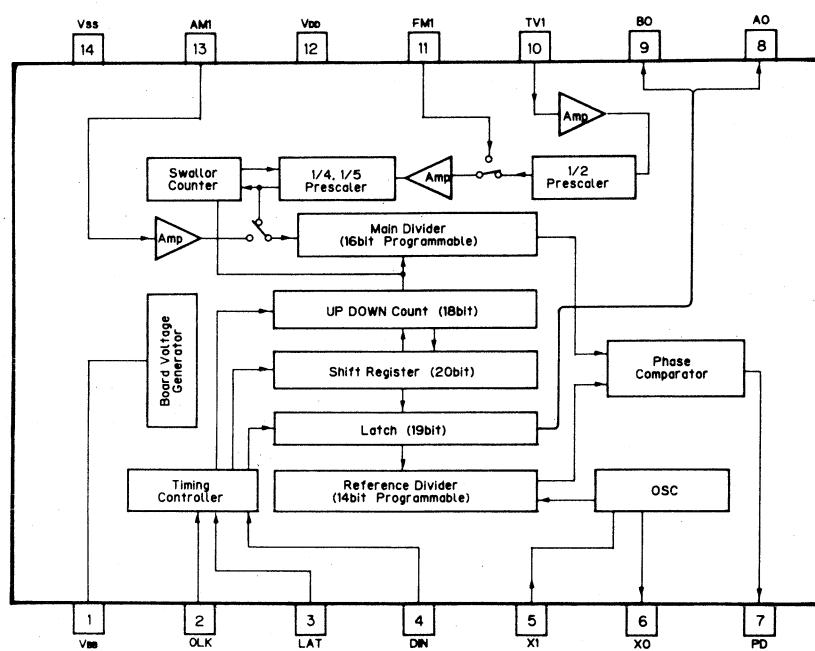
IC51; KHA141



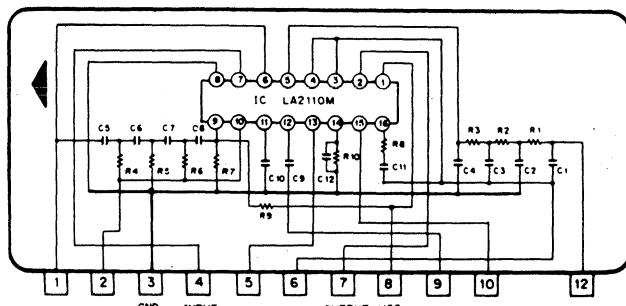
IC451: KHA243



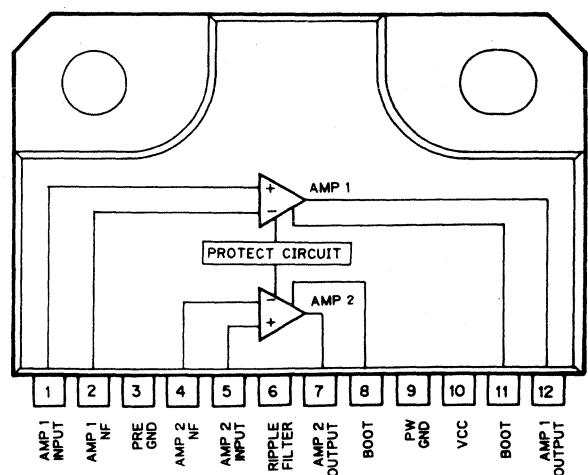
IC501: CX-7925B



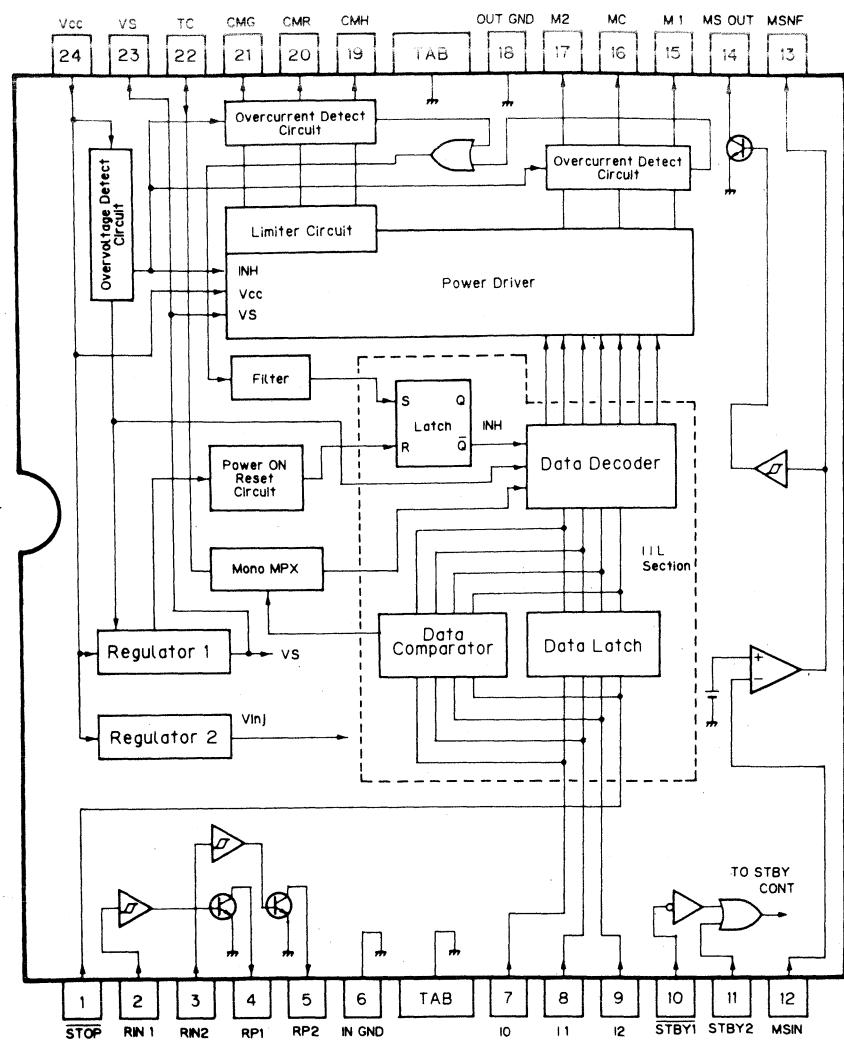
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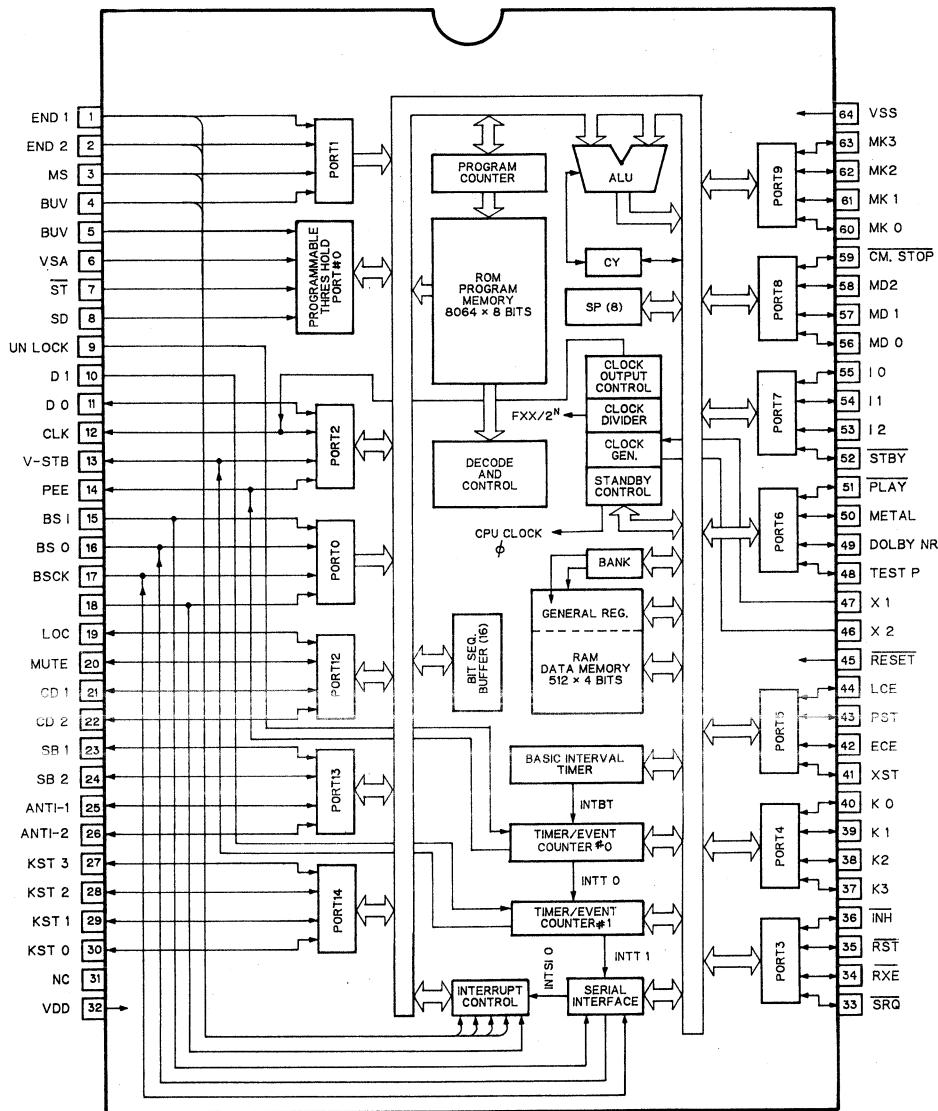
IC551, 552: TA7280P



IC601: PA3022A



## IC701: PD4157A

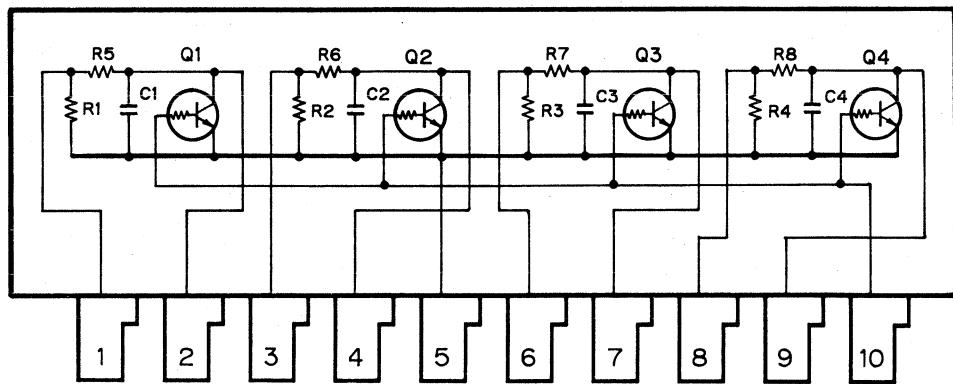


## ● Pin Function (PD4157A)

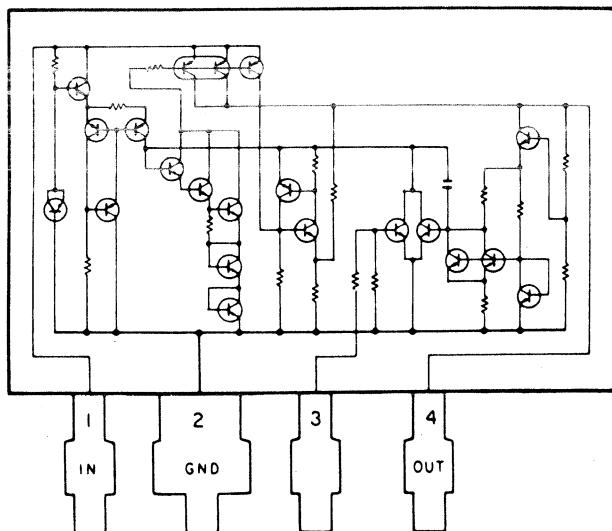
Pin No.	Pin Name	I/O	Function and Operation
1	END1	Input	Reel rotation detection terminal.
2	END2	Input	Detects IC601 (PA3022) pulse output.
3	MS	Input	Tape interim music detection terminal.
4	BUV	Input	Back up +B detector terminal. (0 – 1 – 5V)
5	BUV	Input	
6	VSA	Input	Power SW sense.
7	ST	Input	“L” during stereo.
8	SD	Input	Stop input terminal during seek and scan operation. Seek and scan stops during “H”.
9	UN LOCK	Input	PLL lock detector.
10	D1	Input	Data input.

Pin No.	Pin Name	I/O	Function and Operation
11	D0	Output	Data output.
12	CLK	Output	Clock signal.
13	V-STB	Output	Strobe signal.
14	PEE	Output	4 kHz signal.
15	BS1	Input	Communication data line. (CD CHANGER)
16	BS0	Output	
17	BSCK	I/O	Communication clock line.
18			No connection.
19	LOC	Output	"H" during local search.
20	MUTE	Output	Mute output.
21	CD1	Output	"L" during CD play.
22	CD2	Output	
23	SB1	Output	Source selector control (IC751).
24	SB2	Output	
25	ANT1-1	Output	Causes LED (D919) to flash when Anti-Theft is operating. Shifts to "L" when ACC is OFF and the key matrix switch is pressed.
26	ANT1-2	Output	
27	KST3	Output	Key strobe output.
30	KST0	Output	
31	NC		No connection.
32	VDD		Power supply terminal.
33	SRQ	Output	Communication line. (CD CHANGER)
34	RXE	I/O	
35	RST	Output	Turns LCD display on and off. "L" when LCD display.
36	INH	Output	
37	K3	Input	Key return input.
40	K0	Input	
41	XST	Output	Strobe signal. (IC703, 704)
42	ECE	Output	Chip enable line. (IC702)
43	PST	Output	Strobe signal.
44	LCE	Output	Chip enable line. (IC901)
45	RESET	Input	Reset input terminal. Active "L".
46	X2		Crystal oscillator (194 MHz) connection terminal.
47	X1		
48	TEST P	Input	Test program.
49	DOLBY NR	Output	"H" during dolby NR ON.
50	METAL	Output	"H" during TAPE mode and metal tape detection.
51	PLAY	Output	"L" during PLAY operation.
52	STBY	Output	Input data to IC601 (PA3022). I <sub>2</sub> — I <sub>0</sub> are motor control logic output terminals.
53	I <sub>2</sub>	Output	
55	I <sub>0</sub>	Output	
56	MD0	Output	When the cassette mechanism status changes, a strobe is outputed for the status detection key matrix.
58	MD2	Output	
59	CM. STOP	Output	Capstan motor stops with "L".
60	MK0	Input	Cassette mechanism status detection key input terminal.
63	MK3	Input	
64	VSS		GND

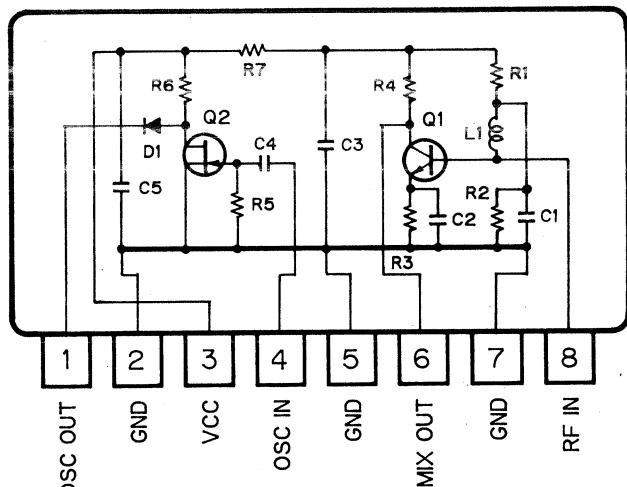
IC651: CWW1144



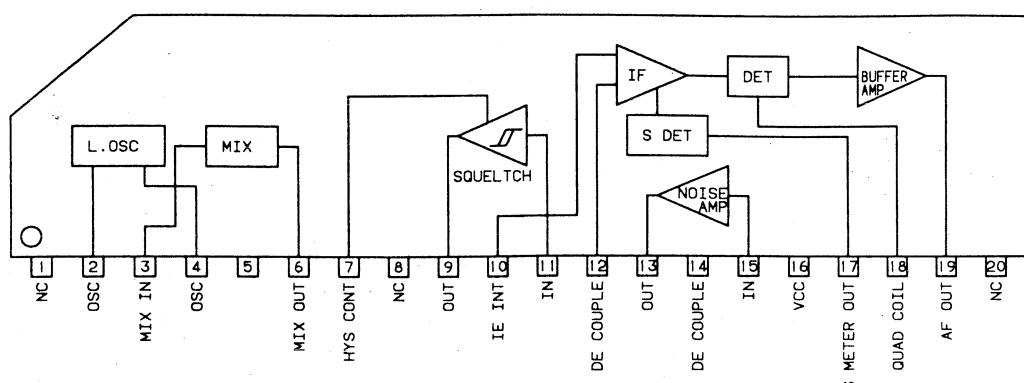
IC751: AN6540



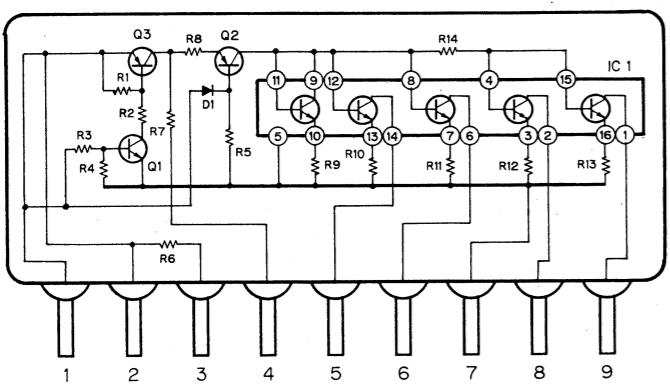
IC802: KHA804



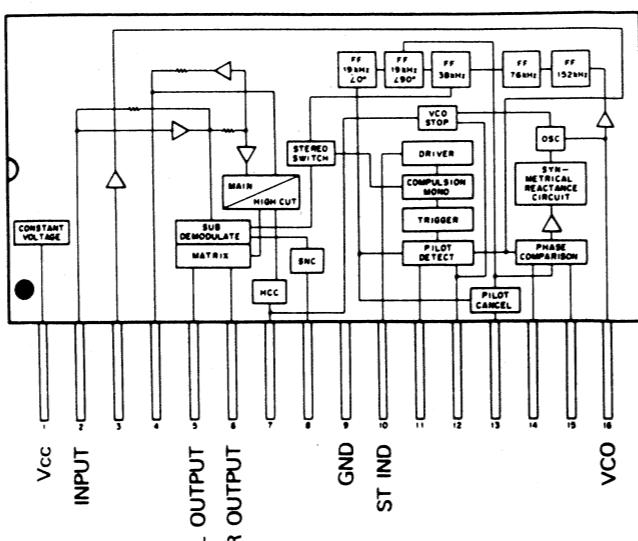
IC801: TK10483Z



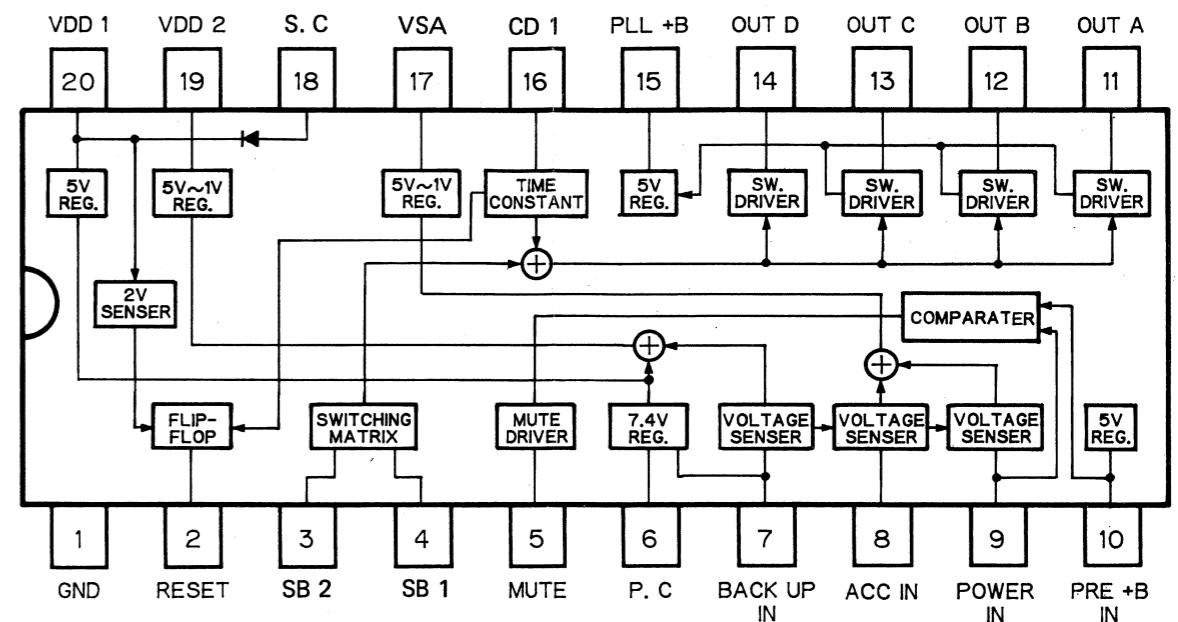
IC903: CWW1158



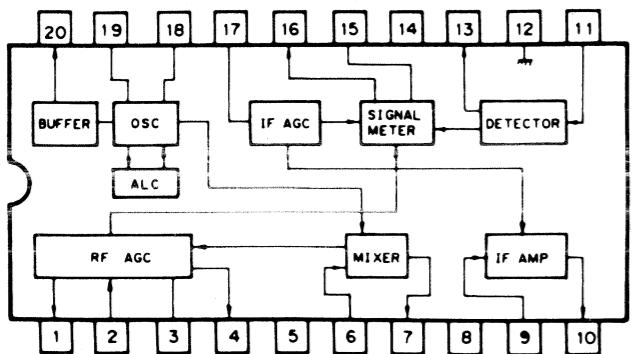
IC151: LA3430P



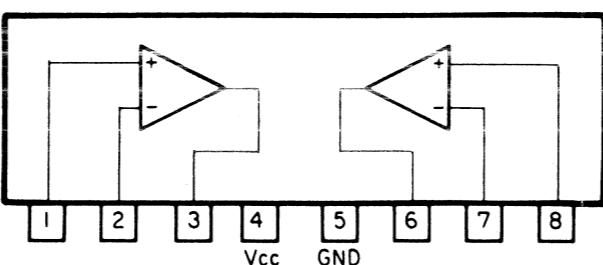
IC752: PA1004



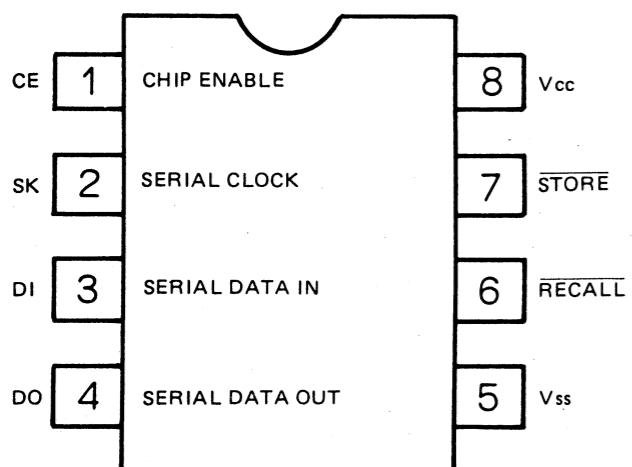
IC201: LA1135



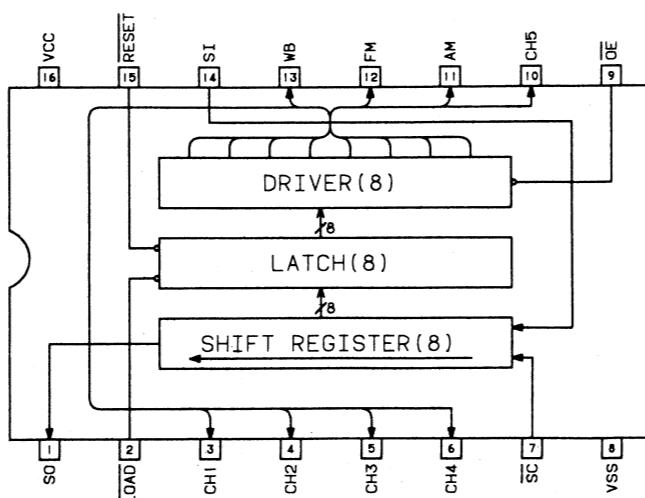
IC251: M51522AL



IC702: PDH001



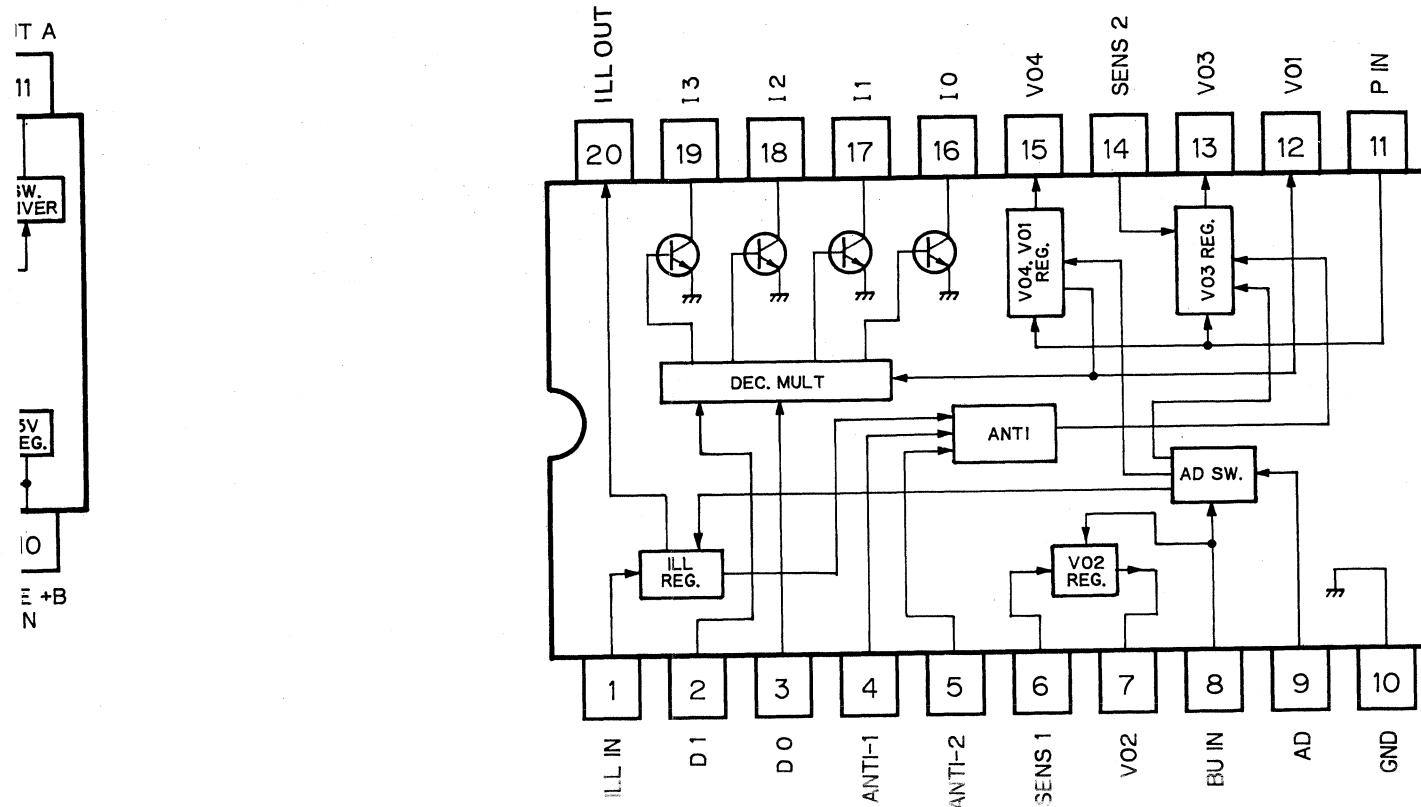
IC703, 704: MB88307P



#### ● Pin Function (PA1004)

Pin No.	Pin Name	Function and Operation
1	GND	GND
2	RESET	Reset puls output.
3	SB2	Switch matrix input.
4	SB1	
5	MUTE	Mute signal output.
6	P.C	Power control.
7	BACK UP IN	Back UP + B input.
8	ACC IN	ACC + B input.
9	POWER IN	Power + B input.
10	PRE + B IN	PRE + B input.
11	OUT A	FM + B output.
12	OUT B	AM + B output.
13	OUT C	WB + B output.
14	OUT D	TAPE + B output.
15	PLL + B	PLL + B output.
16	CD1	Timing capacitor terminal.
17	VSA	Power + B/ACC + B detector output. 0 – 1 – 5V three state output.
18	S.C	VDD maintain capacitor terminal.
19	VDD2	
20	VDD1	5V output.

IC902: PA1005

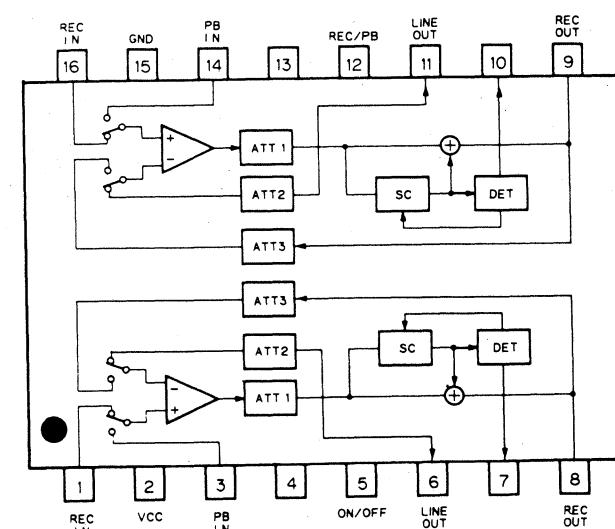


● Pin Function (PA1005)

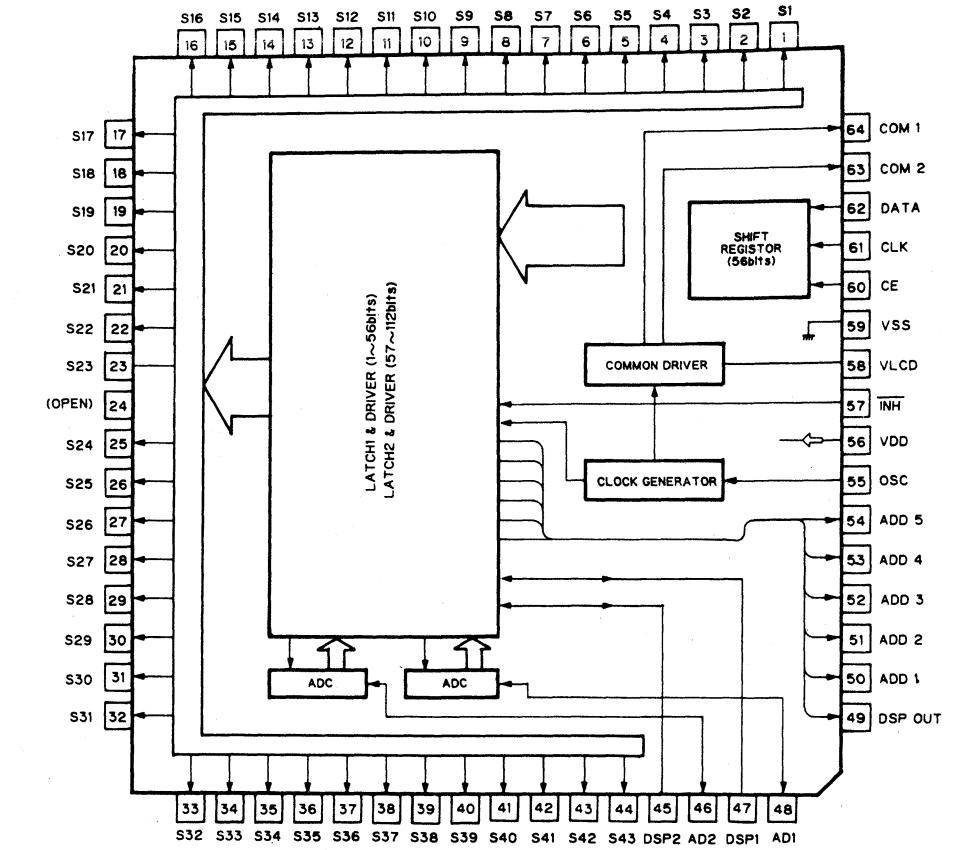
Pin No.	Pin Name	Function and Operation
1	ILL IN	ILLUMI + B input.
2	D1	Data input ( $I_0 - I_3$ control).
3	DO	
4	ANTI-1	Signal input.
5	ANTI-2	Signal input (VO2 control).
6	SENS1	No connection.
7	VO2	9.6V output. (VO1, LAMP)
8	BU IN	UN SWD + B input.
9	AD	Standby input.
10	GND	GND
11	P IN	SWD + B input.
12	VO1	5.7V output. (ch. IND)
13	VO3	9.4V/8V output (DIMER/LCD LAMP)
14	SENS2	No connection.
15	VO4	12.7V output. (MODE IND)
16	$I_0$	Switch output (BAND LED)
17	$I_1$	Switch output. (UP, DOWN LED)
18	$I_2$	Switch output. (FF, REW LED)
19	$I_3$	Switch output. (EJ, SB, DOLBYNR LED)
20	ILL OUT	10.5V output. (Door LED)

● LCD Unit

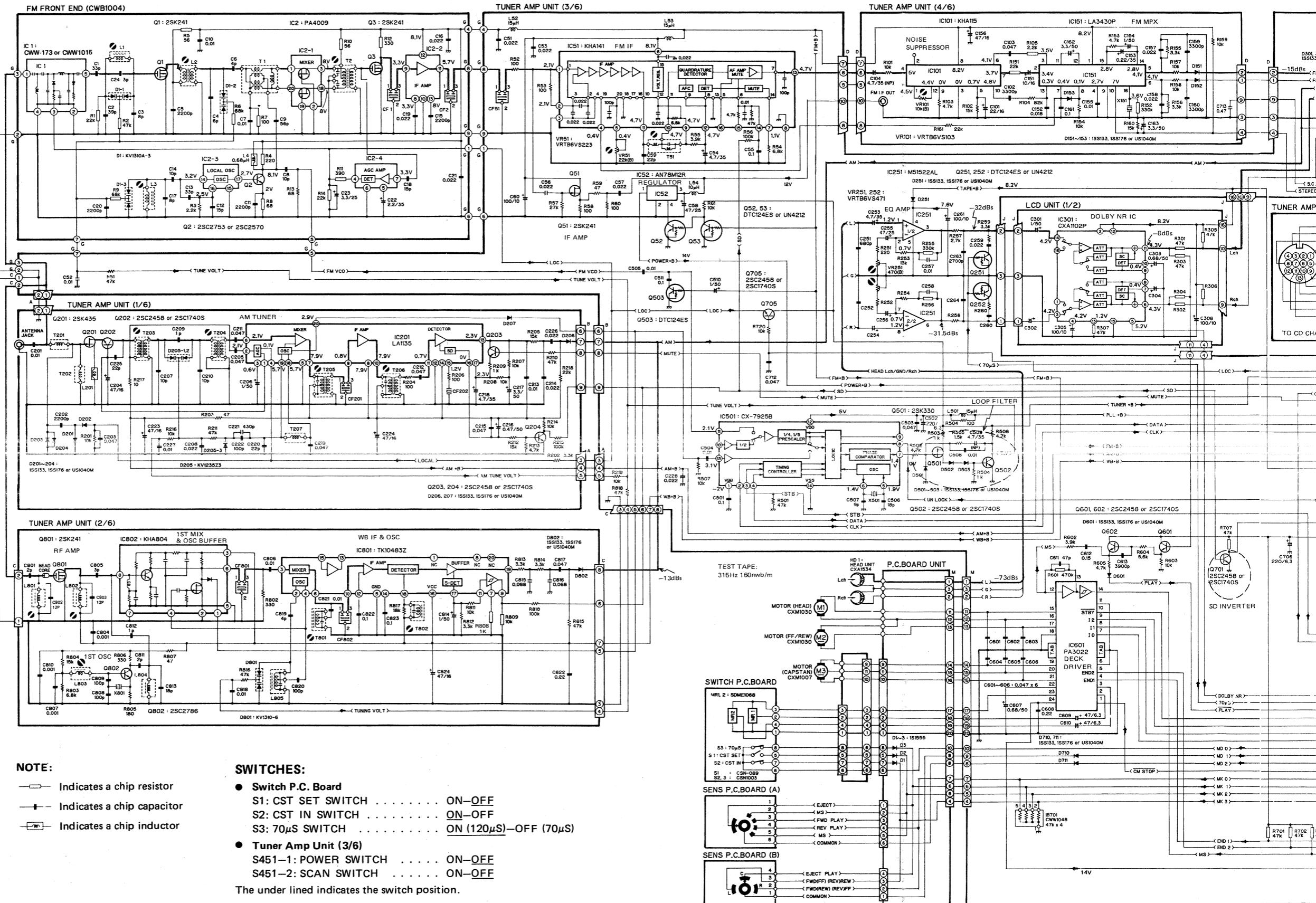
IC301: CXA1102P



IC901: LC7582P



## 9. SCHEMATIC CIRCUIT DIAGRAM



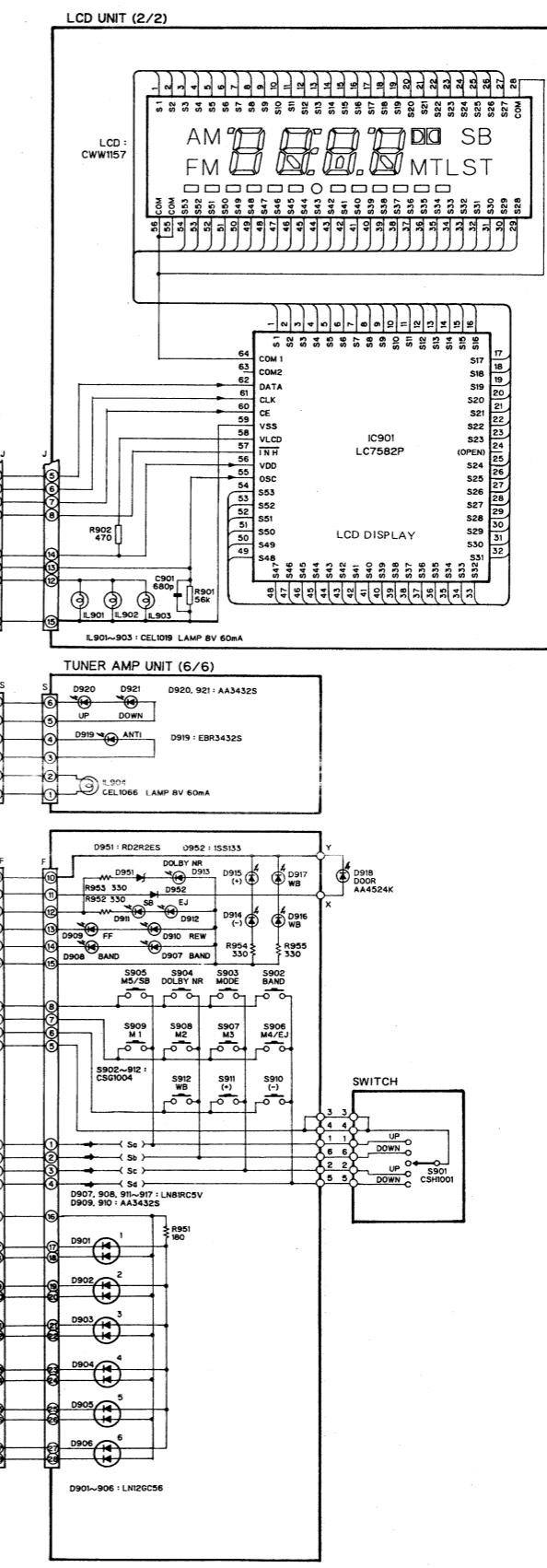
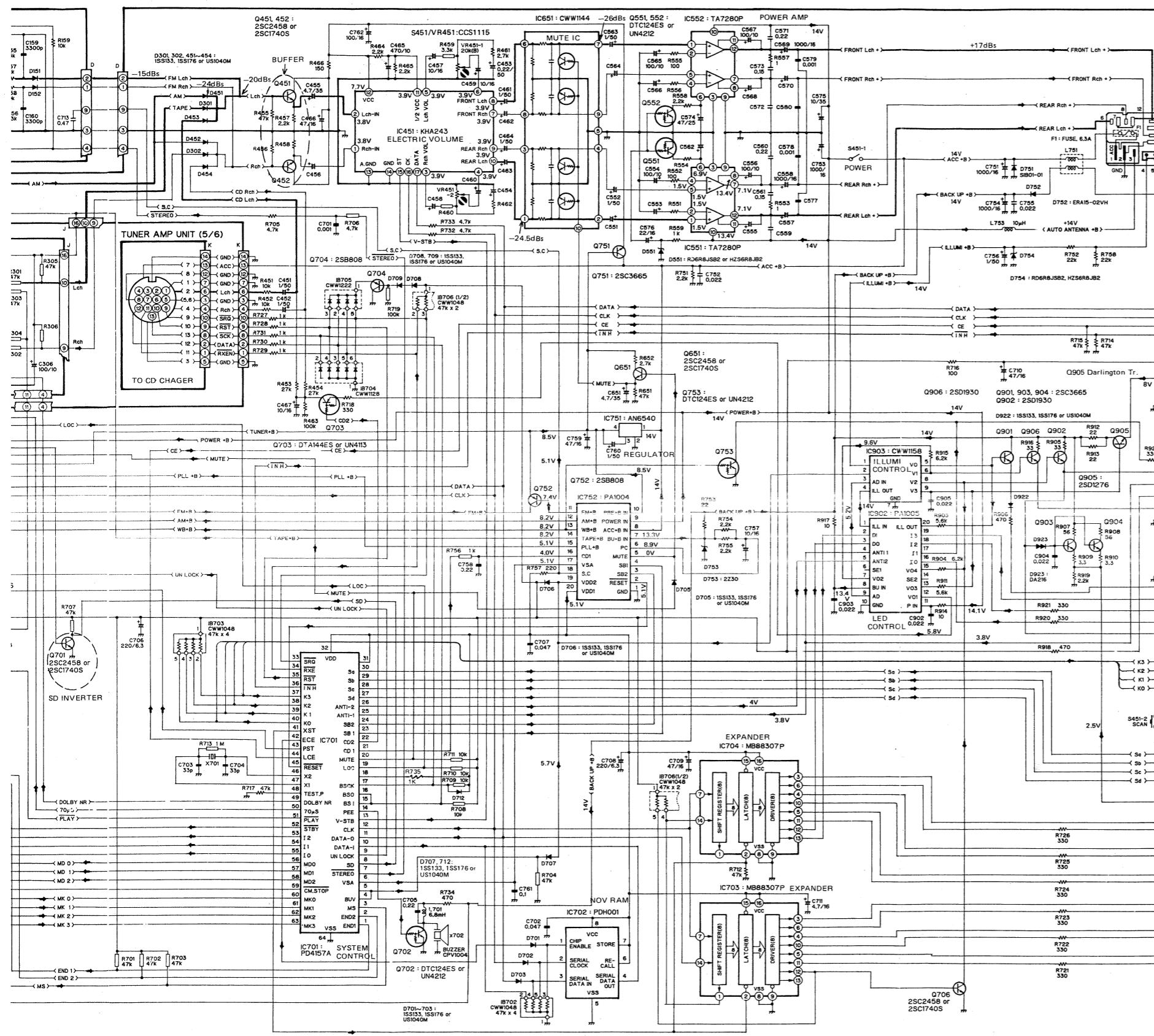
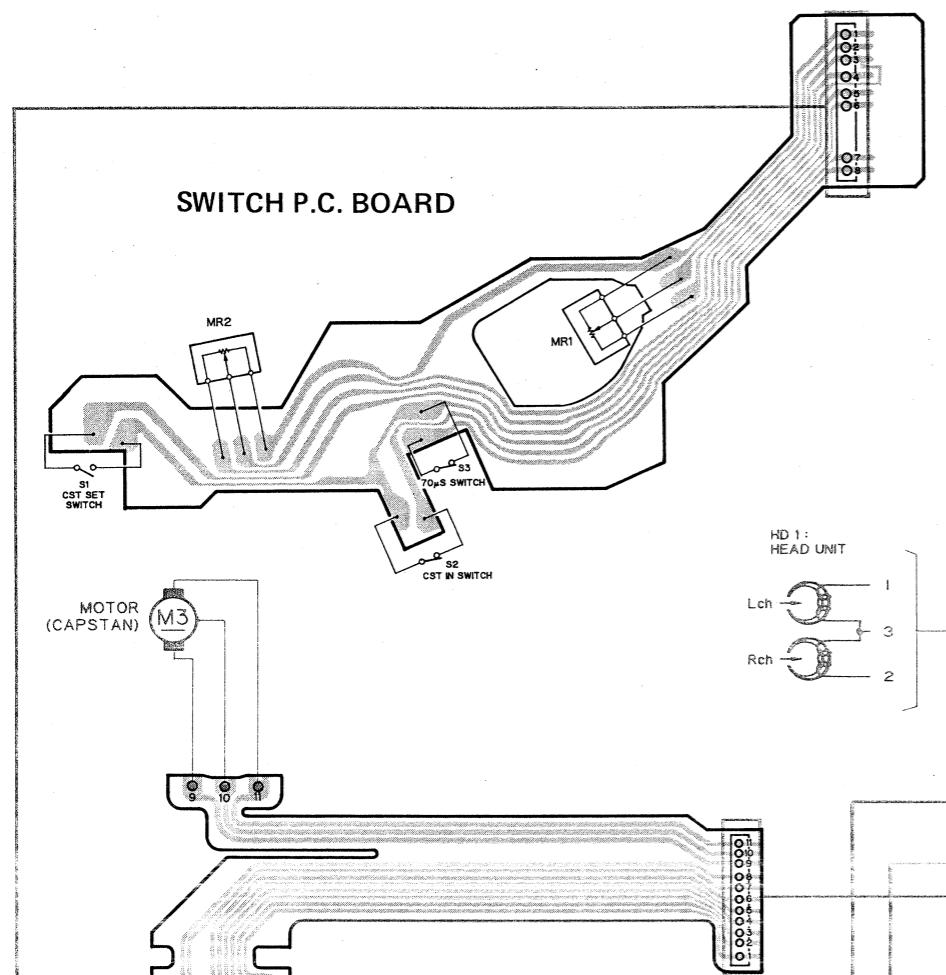


Fig. 11

## 10. CONNECTION DIAGRAM

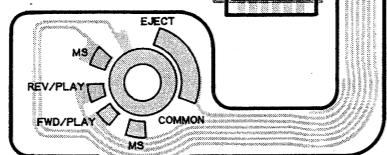
A

SWITCH P.C. BOARD

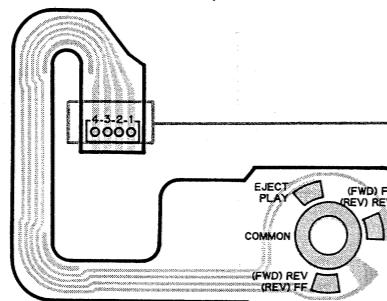


C

SENS P.C. BOARD (A)

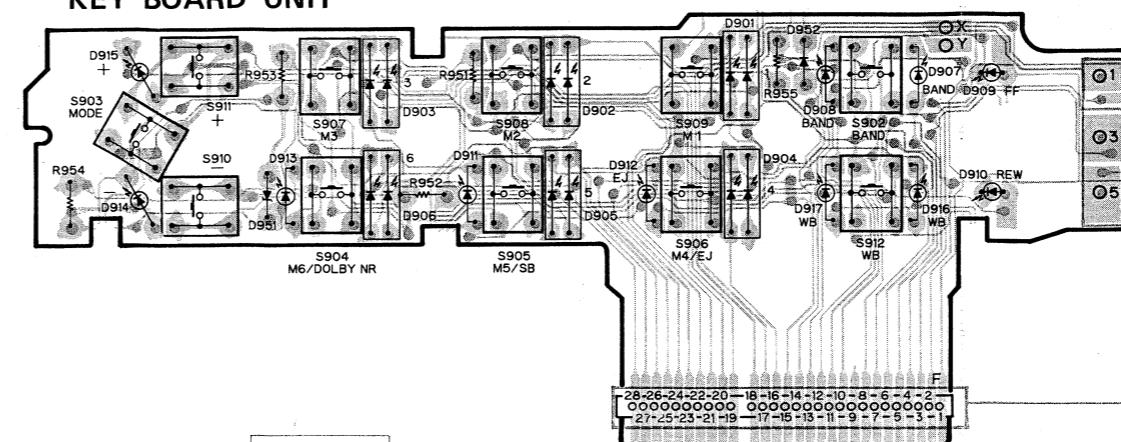


D

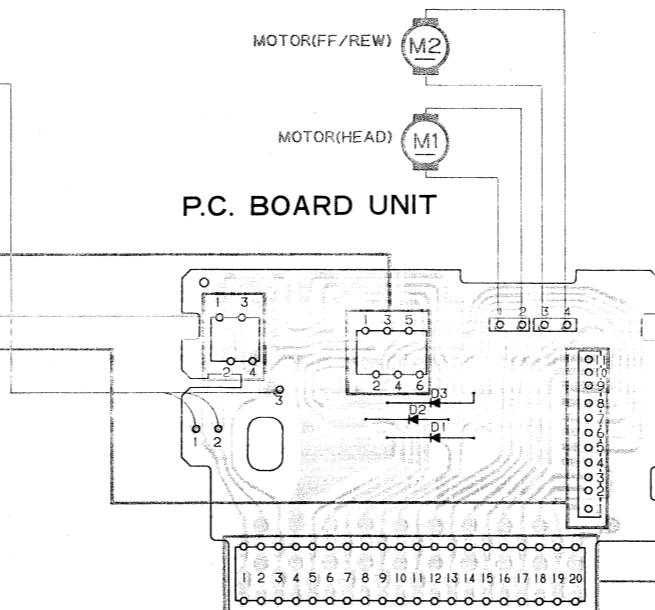


SENS P.C. BOARD (B)

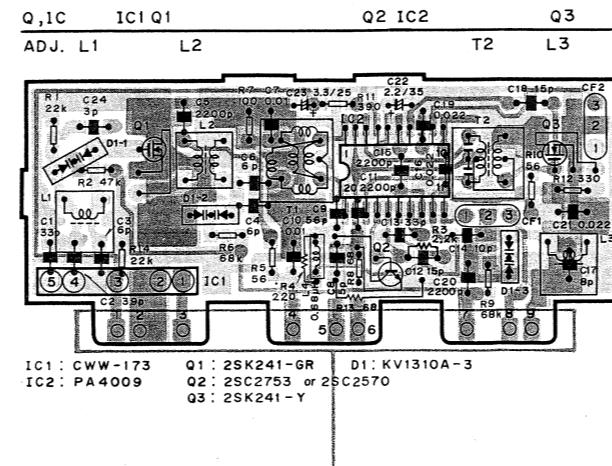
KEY BOARD UNIT



P.C. BOARD UNIT



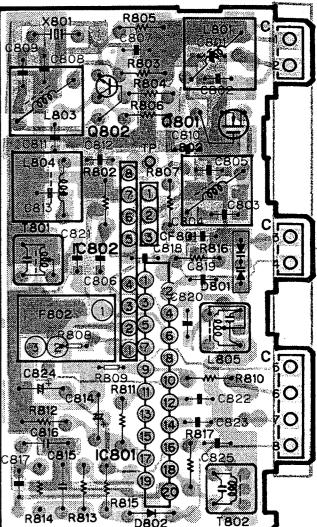
FM FRONT END (CWB1004)



TUNER AMP UNIT (2/6)

IC, Q Q802 IC802 IC801 Q801

ADJ L803 T801 L801 L802 T802



TUNER AMP UNIT (1/6): IC201

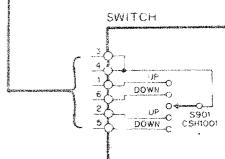
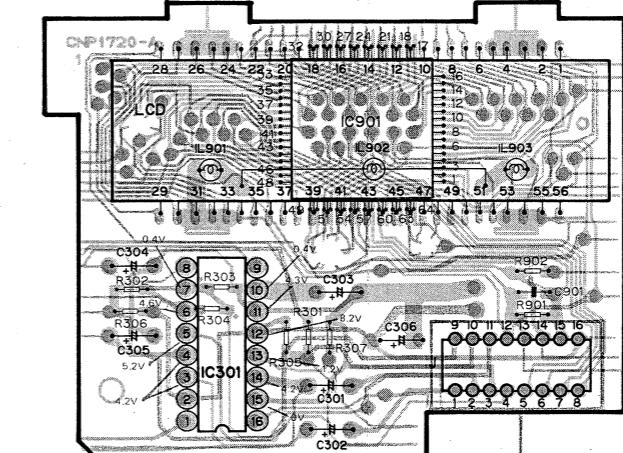
1	2	3	4	5	6	7	8	9	10
2.1V	0.6V	5.2V	0V	2.1V	7.9V	7.9V	0.8V	7.9V	
11	12	13	14	15	16	17	18	19	20
0.7V	0V	2.3V	1.9V	1.2V	0V	2.3V	5.7V	5.7V	2.9V

FM FRONT END: IC2

1	2	3	4	5	6	7	8	9	10
0V	8V			0V	3.3V	3.3V	3.3V	0V	
11	12	13	14	15	16	17	18	19	20
5.7V	8.1V	8V	3.2V	0V	2.5V	2.7V	8V	0V	

LCD UNIT

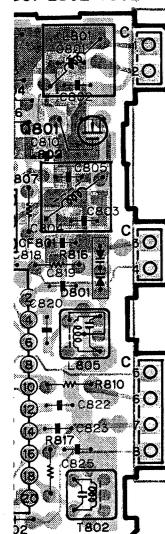
IC IC301 IC901

TUNE  
1  
2.1V  
9  
4.7V

## UNIT (2/6)

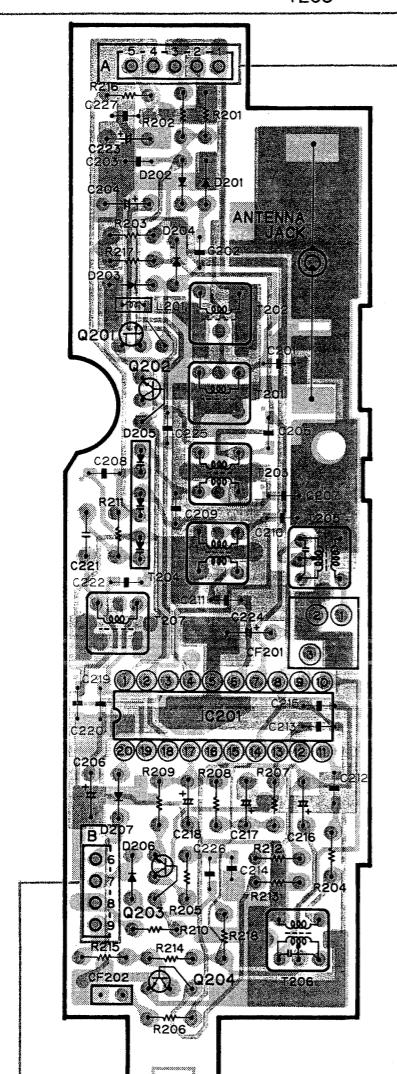
IC801 Q801

301 L802 T802

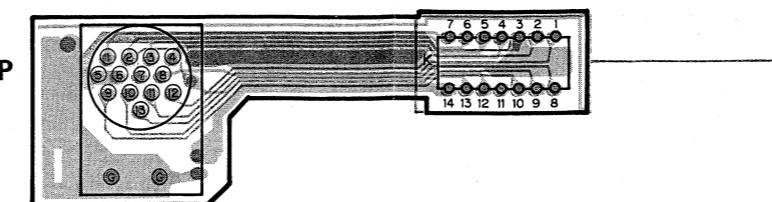


## TUNER AMP UNIT (1/6)

Q202 Q203  
IC, Q Q201 Q204 IC201  
ADJ T203 T204 T206 T205



## TUNER AMP UNIT (5/6)



## TUNER AMP UNIT (3/6): IC51

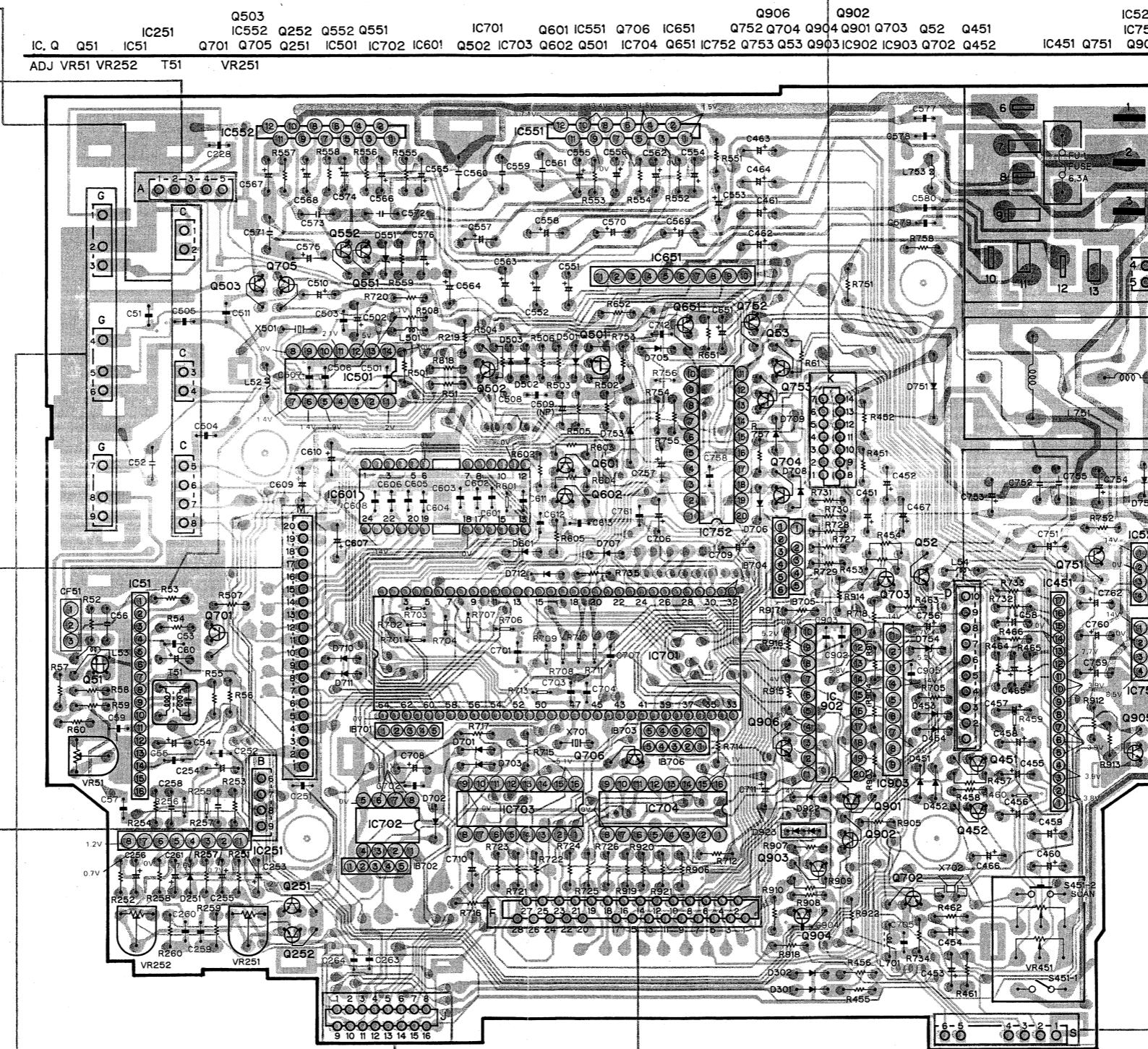
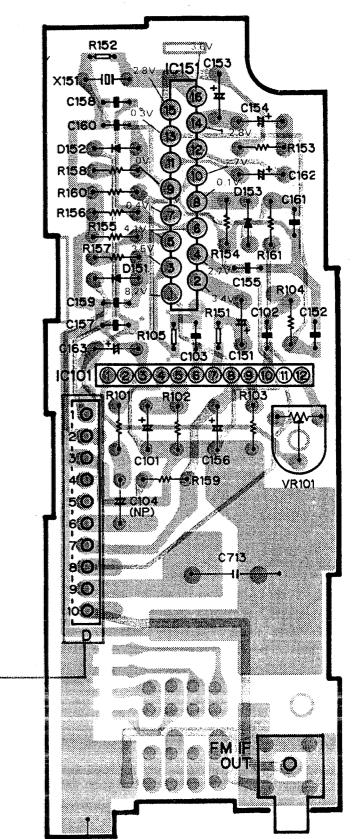
1	2	3	4	5	6	7	8
2.1V	2.1V	0V	0.4V	0.4V	8.1V	1.1V	0V
9	10	11	12	13	14	15	16
4.7V	4.7V	4.7V	4.7V	4.7V			

## TUNER AMP UNIT (3/6): IC752

1	2	3	4	5	6	7	8	9	10
0V	5.1V			0V	8.9V	13.3V	14V	14V	8.5V
11	12	13	14	15	16	17	18	19	20
7.4V	8.2V	8.2V	8.2V	5.1V	4.0V	5.1V	5.1V	5.7V	5.1V

## TUNER AMP UNIT (4/6)

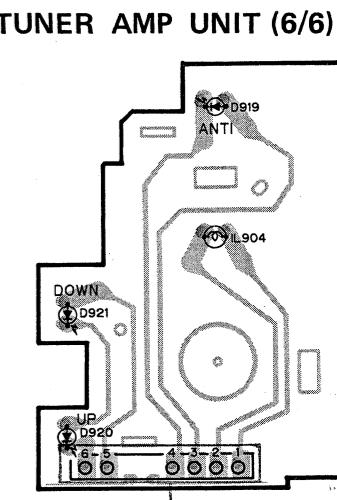
IC, Q IC151 IC101  
ADJ VR101



## TUNER AMP UNIT (3/6)

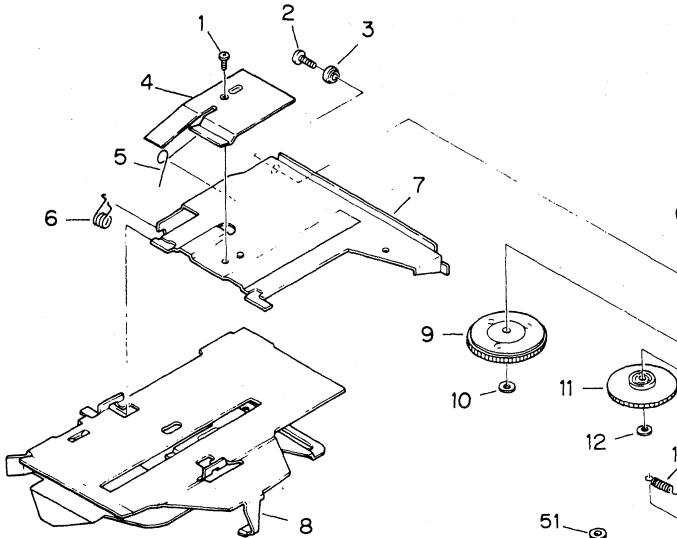
## TUNER AMP UNIT (4/6): IC101

1	2	3	4	5
4.5V		0V	5V	0.7V
6	7	8	9	10
4.1V	3.7V	8.2V	0V	4.8V

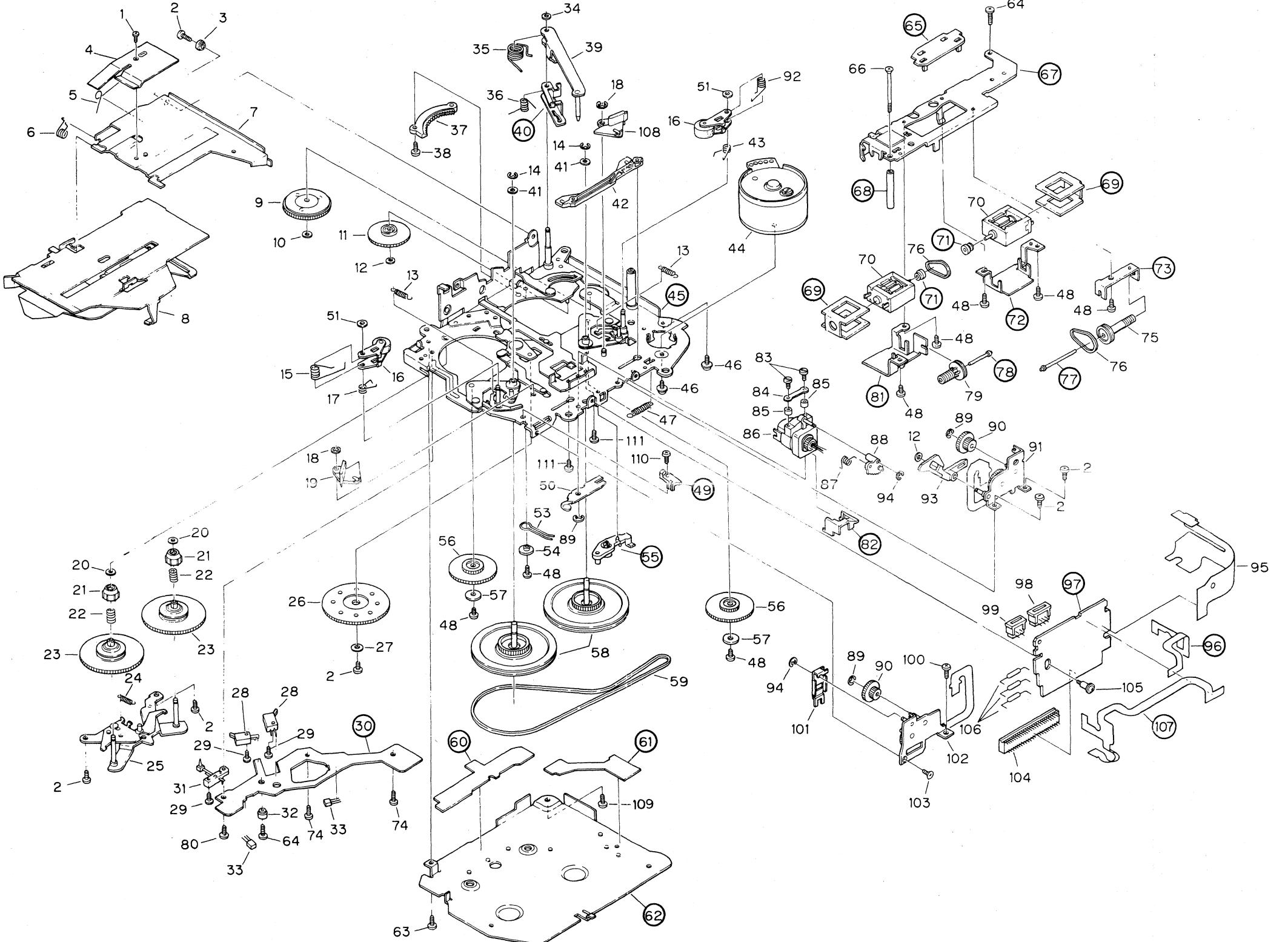


## 11. CASSETTE MECHANISM EXPLODED VIEW

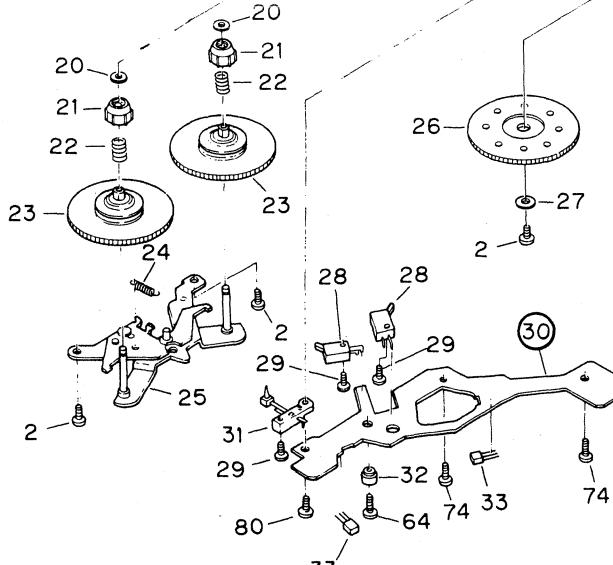
A



B



C



● Parts List  
 NOTE:  
 • For your marks ★  
 ★★: GEN  
 This clas  
 model nu  
 • Parts wh  
 • Parts ma  
 longer th

Mark No

★★

★★

★★

★★

★

● Parts List

NOTE:

- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★: GENERALLY MOVES FASTER THAN ★.
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by (●) are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

A

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
1	HBA-147	Screw M1.4×1.4		35	CBH-887	Spring	
2	BMZ20P040FMC	Screw		36	CBH-886	Spring	
3	CLB-663	Bush		37	CNV1075	Gear	
4	CBL1043	Spring		38	CBA1004	Screw M2×6	
5	CBH-867	Spring		39	CXD-389	Arm Unit	
6	CBH-837	Spring		40		Arm	
7	CNC1597	Arm		41	HBF-179	Washer	
8	CXA2164	Holder Unit		42	CNV1257	Lever	
9	CXA2088	Gear Unit		43	CBH-833	Spring	
10	CBF1024	Washer	★★	44	CXM1007	Motor (Capstan)	
11	CNY-271	Gear		45		Chassis Unit	
12	CBF-126	Washer		46	PMS26P025FMC	Screw	
13	CBH-835	Spring		47	CBH-830	Spring	
14	CBG1003	E Type Washer		48	HBA-175	Screw M2×2.5	
15	CBH-832	Spring		49		Spacer	
16	CXA1445	Pinch Roller Unit		50	CBL1050	Spring	
17	CBH-834	Spring		51	CBF1025	Washer	
18	YE25FUC	E Type Washer		52	....		
19	CNV1254	Arm		53	CBH-893	Spring	
20	CBF1022	Washer		54	CLA1110	Collar	
21	CNW-932	Collar		55		Clamper	
22	CBH-827	Spring		56	CNV1616	Gear	
23	CXA2089	Reel Unit		57	CLA1238	Collar	
24	CBH-868	Spring		58	CNV1572	Flywheel	
25	CXA1481	Bracket Unit	★★	59	CNT-111	Belt	
26	CNW-944	Gear		60		Insulator	
27	CLA1109	Collar		61		Insulator	
28	CSN1003	Switch(70μS, CST IN)		62		Cover	
29	CBA1025	Screw M1.7×5.5		63	BMZ20P030FMC	Screw	
30		P.C. Board		64	CBA-172	Screw M1.7×5.5	
31	CSN-089	Switch(CST SET)		65		Holder	
32	CLA1170	Collar		66	CBA-165	Screw M2×25	
33	SDME106B	Magnetic Resistive Device	★	67		Guide	
34	CBF-046	Washer		68		Spacer	
				69		Insulator	

B

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description	
★★	70	CXM1030	Motor (FF/REW, Head Position)	93	CNV1495	Arm		
	71		Pulley	94	YE15FUC	E Type Washer		
	72		Bracket	95	CNP1227	P.C. Board		
	73		Bracket	96		P.C. Board		
	74	CBA1037	Screw M2×2.5	98	CKS1075	Connector (6P)		
★★	75	CNV1255	Pulley	99	CKS1073	Connector (4P)		
	76	CNT1010	Belt	100	BMZ20P060FMC	Screw		
	77		Shaft	101	CNH-004	Arm		
	78		Shaft	102	CXA1548	Holder Assy		
	79	CNV1256	Pulley	103	HBA-209	Screw M2×2		
	80	CBA1054	Screw M2×5	104	CKS-678	Connector (20P)		
	81		Bracket	105	CBA1022	Screw M2×2×3		
	82		Cover	★	106	1S1555	Diode	
	83	CBA1055	Screw M1.4×8	107		P.C. Board		
★★	84	CBE-114	Spring	108	CNV1253	Arm		
	85	CNY-134	Azimuth Rubber	109	CBA1060	Screw M2×7		
	86	CXA1534	Head Unit	110	CBA1015	Screw M2×4		
	87	CBH-829	Spring	111	CBA1041	Screw M2×2.5		
	88	CNW-939	Gear					
	89	YE12FUC	E Type Washer					
	90	CNV1262	Gear					
	91	CXA1546	Holder Assy					
	92	CBH-831	Spring					

C

★★	16	CXA1445	Pinch Roller Unit	50	CBL1050	Spring	
	17	CBH-834	Spring	51	CBF1025	Washer	
	18	YE25FUC	E Type Washer	52	....		
	19	CNV1254	Arm	53	CBH-893	Spring	
	20	CBF1022	Washer	54	CLA1110	Collar	
★★	21	CNW-932	Collar	55		Clamper	
	22	CBH-827	Spring	56	CNV1616	Gear	
	23	CXA2089	Reel Unit	57	CLA1238	Collar	
	24	CBH-868	Spring	58	CNV1572	Flywheel	
	25	CXA1481	Bracket Unit	★★	59	CNT-111	Belt
★★	26	CNW-944	Gear	60		Insulator	
	27	CLA1109	Collar	61		Insulator	
	28	CSN1003	Switch(70μS, CST IN)	62		Cover	
	29	CBA1025	Screw M1.7×5.5	63	BMZ20P030FMC	Screw	
	30		P.C. Board	64	CBA-172	Screw M1.7×5.5	

D

★★	31	CSN-089	Switch(CST SET)	65		Holder	
	32	CLA1170	Collar	66	CBA-165	Screw M2×25	
★	33	SDME106B	Magnetic Resistive Device	67		Guide	
	34	CBF-046	Washer	68		Spacer	
				69		Insulator	

## 12. CHASSIS EXPLODED VIEW

A

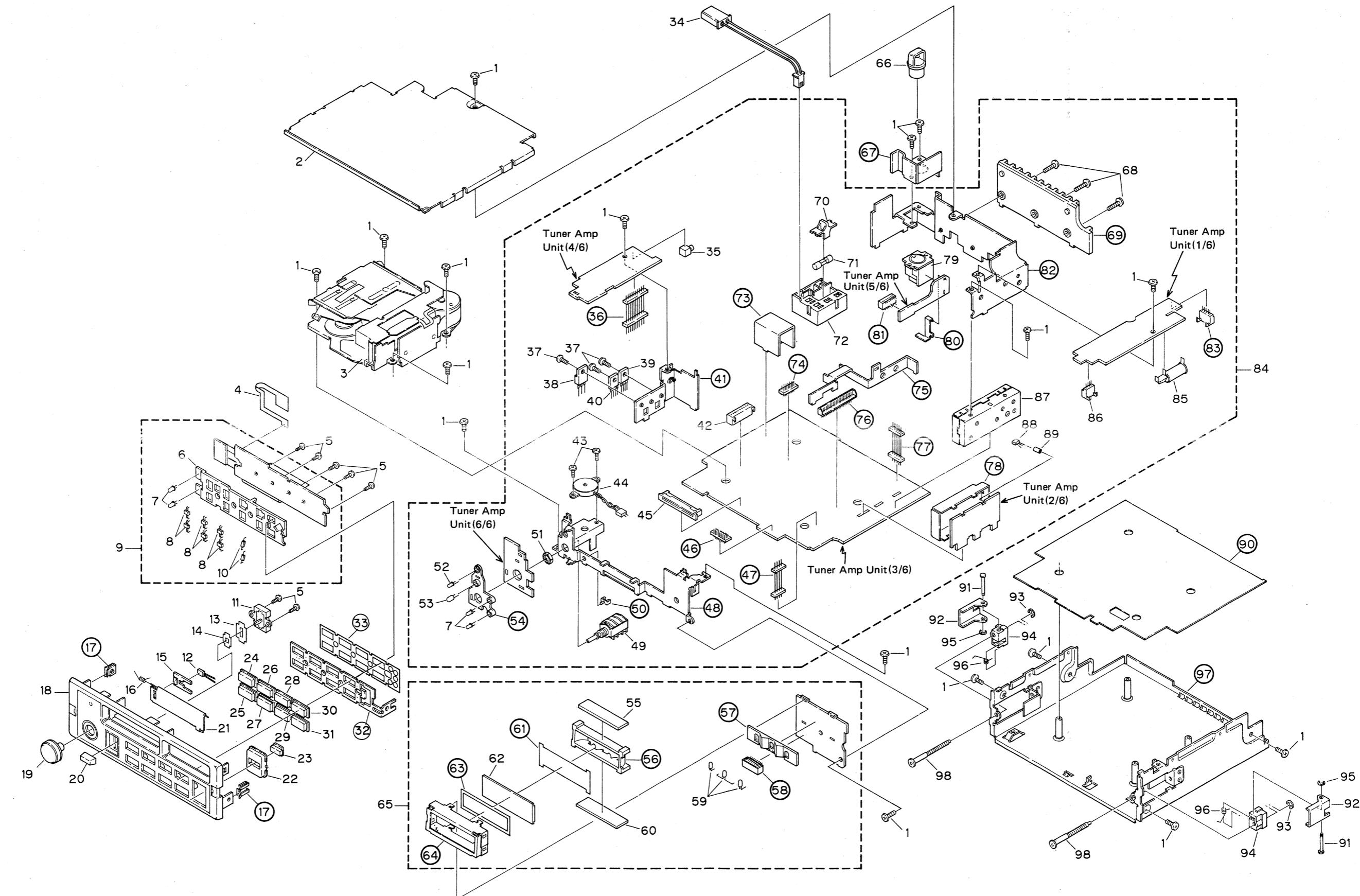
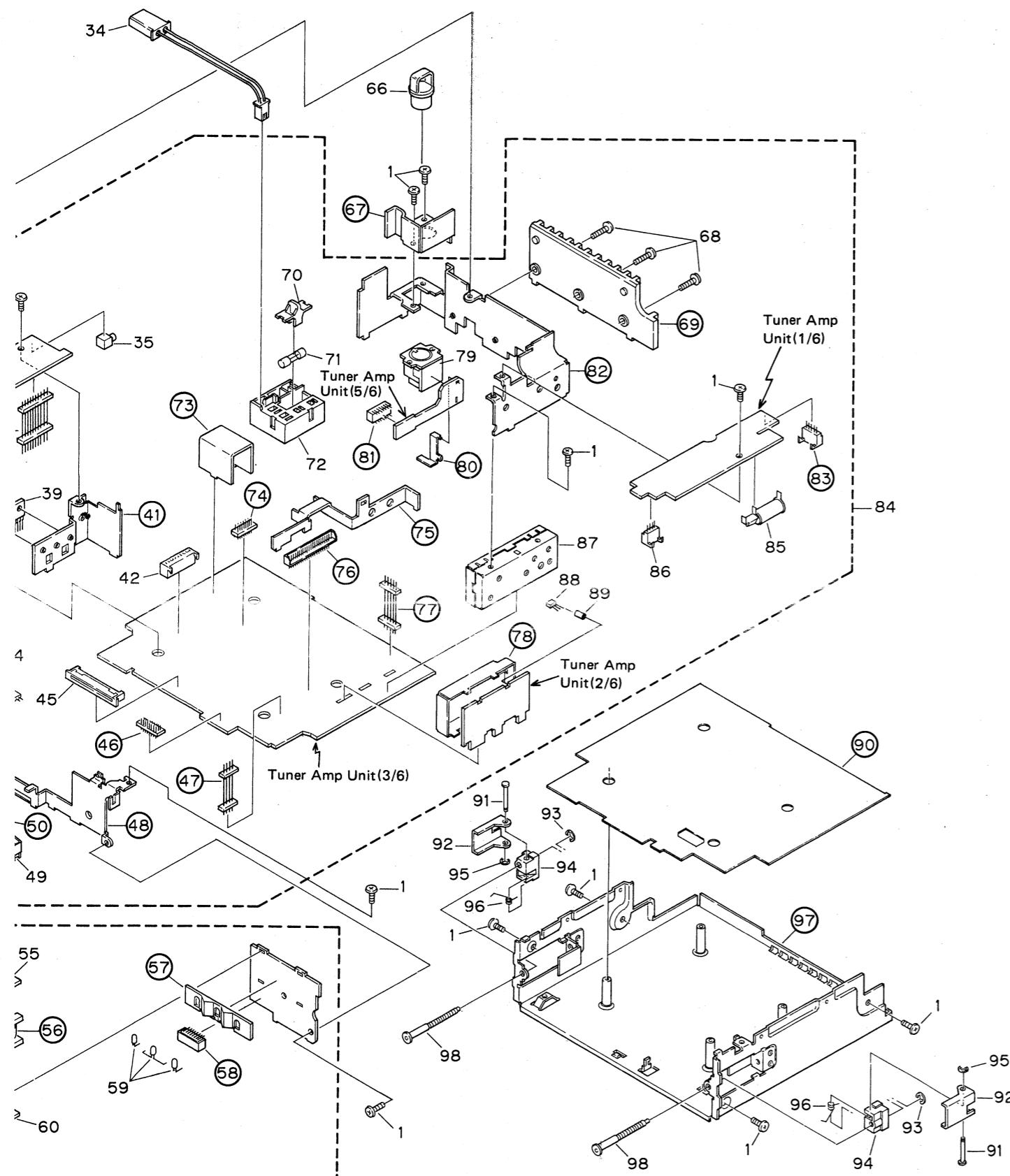


Fig. 14





Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.	
** Q 201		2SK435	CF 801	FM Ceramic Filter	CTF-101			R 713		RS1/8S105J	C 577 578 579 580 701 804 807 810				CKSYB102K50	
** Q 202 203 204 451 452 502 601 602 651 701		2SC2458	CF 802	Filter	CTF1004	IB 701 702 703 706	CWV1048	R 718	721 722 723 724 725 726 802 806 920	RD1/4PS331JL	C 602 603 604 605 606 702 707 712				CKSYF473Z50	
		(2SC1740S)	IB 704		CWV1128	IB 705	CWV1222	R 719		RS1/8S104J	C 607				CEAR6RM50LS2	
** Q 501		2SK330						R 734	906 918	RD1/4PS471JL	C 608 705 758 825				CKSYF224Z25	
** Q 703		DTA144ES	(UN4113)	X 151	Ceramic Resonator	CSS1028		R 753	912 913	RD1/4PS220JL	C 609 610				CEA470M6R3LS	
** Q 704 752		2SB808	X 501	Xtal Resonator 4.5MHz	CSS1011	X 701	Xtal Resonator 194MHz	R 756		RS1/8S102J	C 611				CCSCH470J50	
** Q 705 706		2SC2458	X 702	Buzzer	CSP1004	(2SC1740S)	X 801	R 805		RD1/4PS181JL	C 612				CKSYF154Z25	
** Q 751 901 903 904		2SC3665		Xtal Resonator 50.59166MHz	CSS1001			R 808		RS1/8S102J	C 613				CKSYB392K50	
** Q 801		2SK241	** VR 51	Semi-fixed 22kΩ(8)	VRTB6VS223			R 814		RD1/4PS332JL	C 703 704				CCSCH330J50	
** Q 802		2SC2786	** VR 101	Semi-fixed 10kΩ(8)	VRTB6VS103			R 817		RD1/4PS183JL	C 706 708				CEA221M6R3LL	
** Q 902 906		2SD1930	** VR 251 252	Semi-fixed 470Ω(8)	VRTB6VS471										CSY4R7M160S	
** Q 905 (Darlington Tr)		2SD1276	** VR 451/S 451	Volume	CCS1115			R 904	915	RD1/4PS622JL	C 709 711				CCL1014	
* D 151 152 153 201 202 203 204 206 207 251		ISS133		FM Front End	CWB1004			R 905	916	RD1/4PS330JL	C 713				CCSCH020C50	
		(ISS176)		Fuse 125V 6.3A	CEK1007			R 907	908	RD1/4PS560JL	C 801 811				CCSCH120J50	
		(US1040M)		Lamp 8V 60mA	CEL1066			R 909	910	RD1/4PS3R3JL	C 802 803				CCSCH030C50	
								R 921	922	RD1/4PS331JL	C 805					
* D 205		KV1235Z3													C 808 809	
* D 301 302 451 452 453 454 501 502 503 601		ISS133													C 815 816	
		(ISS176)													C 817	
* D 551 754		RD6R8JSB2													CCSCH101J50	
															C 819	
															C 820	
* D 701 702 703 705 706 707 708 709 710		(HZS6R8JB2)	R 51	815 816 818	RD1/4PS473JL			C 51	53 57 157 158 208 214 226 902	CKSYB223K50						
			R 52	53 58 60 204 206 551 552 555 556	RD1/4PS101JL			C 52		CKPYV103M16L						
			R 54	803	RD1/4PS882JL			C 54	218 651	CEA4R7M35LS	Unit Number : CWM1506					
			R 55	602	RD1/4PS392JL			C 55	161 501 511 761 822 823	CKSYF104Z25	Unit Name : LCD Unit					
			R 56	215 463 810	RD1/4PS104JL			C 56	752 755	CKCYF223Z50						
															MISCELLANEOUS	
* D 711 712 802 922		ISS133	R 57	453 454	RD1/4PS273JL			C 58	255 256 562 574	CEA470M25L2						
		(ISS176)	R 59	203 807	RD1/4PS470JL			C 59	220 225	CCSUJ220J50	Mark ===== Circuit Symbol & No. ===== Part Name Part No.					
* D 751		S1801-01	R 61	154 157 158 159 201 207 208 214	RD1/4PS103JL			C 60	156 204 223 224 466 710 759 824	CEA470M16LS						
* D 752		ERA15-02VH	R 101	811	RD1/4PS103JL			C 101	576	CEA220M16I2	** IC 301				CXA1102P	
* D 753		2Z30	R 102	160 205 212 804	RD1/4PS153JL			C 102	159 160	CKSYB332K50	** IC 901				LC7582P	
* D 801		KV1310-6	R 103	153 213 502 506 605 705 732 733	RD1/4PS472JL			C 103	203 205 211 212 215 219 503 601	CKSYF473Z50	** IL 901 902 903	Lamp 8V 60mA				CEL1019
* D 919	LED	E8R3432S	R 104		RD1/4PS823JL			C 104	455 456	CEA4R7M35NPLL	LCD				CWW1157	
* D 920 921	LED	AA3432S	R 105		RS1/8S222J			C 151	457 458 459 460 467 757	CEA100M16LS2	RESISTORS					
* D 923		DA216	R 151		RS1/8S223J			C 152		CKSYB183K50						
L 52 53 501		Ferri-Inductor 15μH	R 152	255 256	RS1/8S334J			C 153		CSZAR22K35	Mark ===== Circuit Symbol & No. ===== Part Name Part No.					
L 54 753		Inductor 10μH	LAU150K													
L 201		Inductor	CTF1053													
L 701		Inductor 6.8mH	CTF1056	R 155	156 202 259 260 812 813	RD1/4PS332JL										
L 751		Coil	CTF1051	R 161	218 752 758	RD1/4PS223JL										
			CTH1039	R 209	503 504 559 727 728 729 730 731 735	RD1/4PS102JL										
				R 210	211 455 456 501 651 712 714 715 717	RD1/4PS473JL										
				R 216	219 451 452 507 603 720	RD1/4PS103JL										
L 801 802 804		Coil	CTC1006	R 217	914 917	RD1/4PS100JL										
L 803		Coil	CTC1030	R 251	252 757	RD1/4PS221JL										
L 805		Coil	CTE1001	R 253	254	RD1/4PS133JL										
T 51		Coil	CTC1029	R 257	258 461 462 652	RD1/4PS272JL										
T 201		Coil	CTB1011	R 457	458 464 465 554 558 751 754 755 919	RD1/4PS222JL										
T 202		Coil	CTB1012	R 459	460	RS1/8S332J										
T 203 204		Coil	CTB1013	R 466		RD1/4PS151JL										
T 205		Coil	CTE1011	R 505		RD1/4PS152JL										
T 206		Coil	CTE1012	R 508	716	RD1/4PS101JL										
T 207		Coil	CTB1014	R 553	557	RD1/4PS010JL										
T 801		Coil	CTE1002	R 601		RS1/8S474J										
T 802		Coil	CTE1003	R 604	903 911	RD1/4PS562JL										

## RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.	Unit Number :	Unit Name	Part No.
	R 951		RD1/4PS181JL			
	R 952 953 954 955		RD1/4PS331JL	** S 1	Switch(CST SET)	CSN-089
				** S 2 3	Switch(CST IN 70 $\mu$ S)	CSN1003
				* MR 1 2	Magnetic Resistive Device	SDME106B
Unit Number :						
Unit Name :						
Mark	Circuit Symbol & No.	Part Name	Part No.	Miscellaneous Parts List		
* D 1 2 3		1S1555		** S 901	Switch	CSH1001
				* D 918	LED(DOOR)	AA4524K
				** HD 1	Head Unit	CXA1534
				** M 1 2	Motor(Head Gear)	CXM1030
				** M 3	Motor(Capstan)	CXM1007

## 14. PACKING METHOD

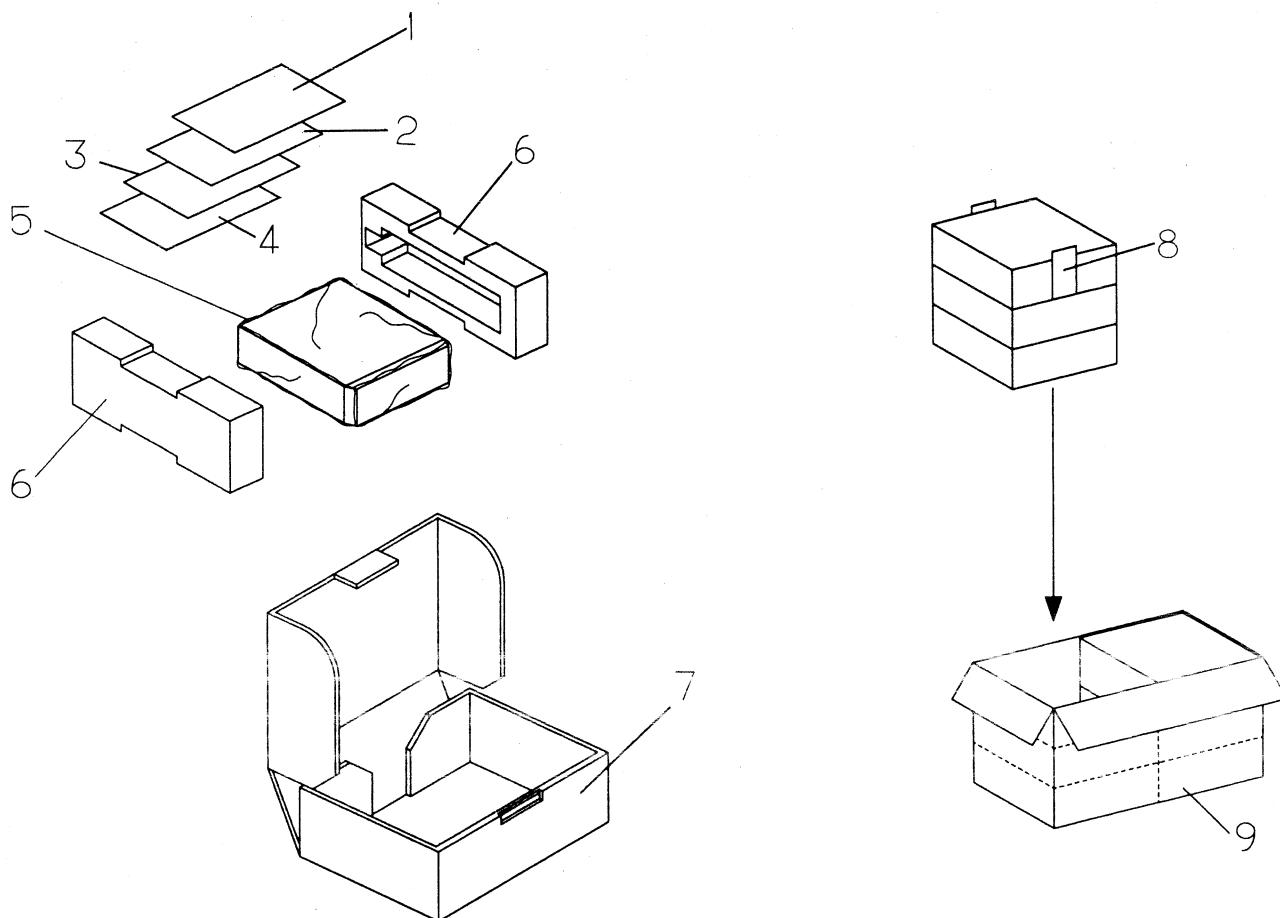


Fig. 15

### ● Parts List

Mark	No.	Part No.	Description
1.	CRB1112		Owner's Manual
2.	CRB1113		Installation Manual
3.	CRB1105		WB Manual
4-1.	CRY1005		Envelope
4-2.			Level
4-3.			Film (x2)
4-4.	CRY1003		Card (x2)
4-5.	CRW1014		Level
4-6.	CRW1009		Tag
5.	CEG-162		Polyethylene Bag
6.	CHP1030		Styrofoam
7.	CHG1483		Carton
8.	CWH1009		Paper Sheet
9.	CHL1461		Contain Box

## 15. CD MODE CONTROL LOCATION AND OPERATION (WITH CD CHANGER OPTION)

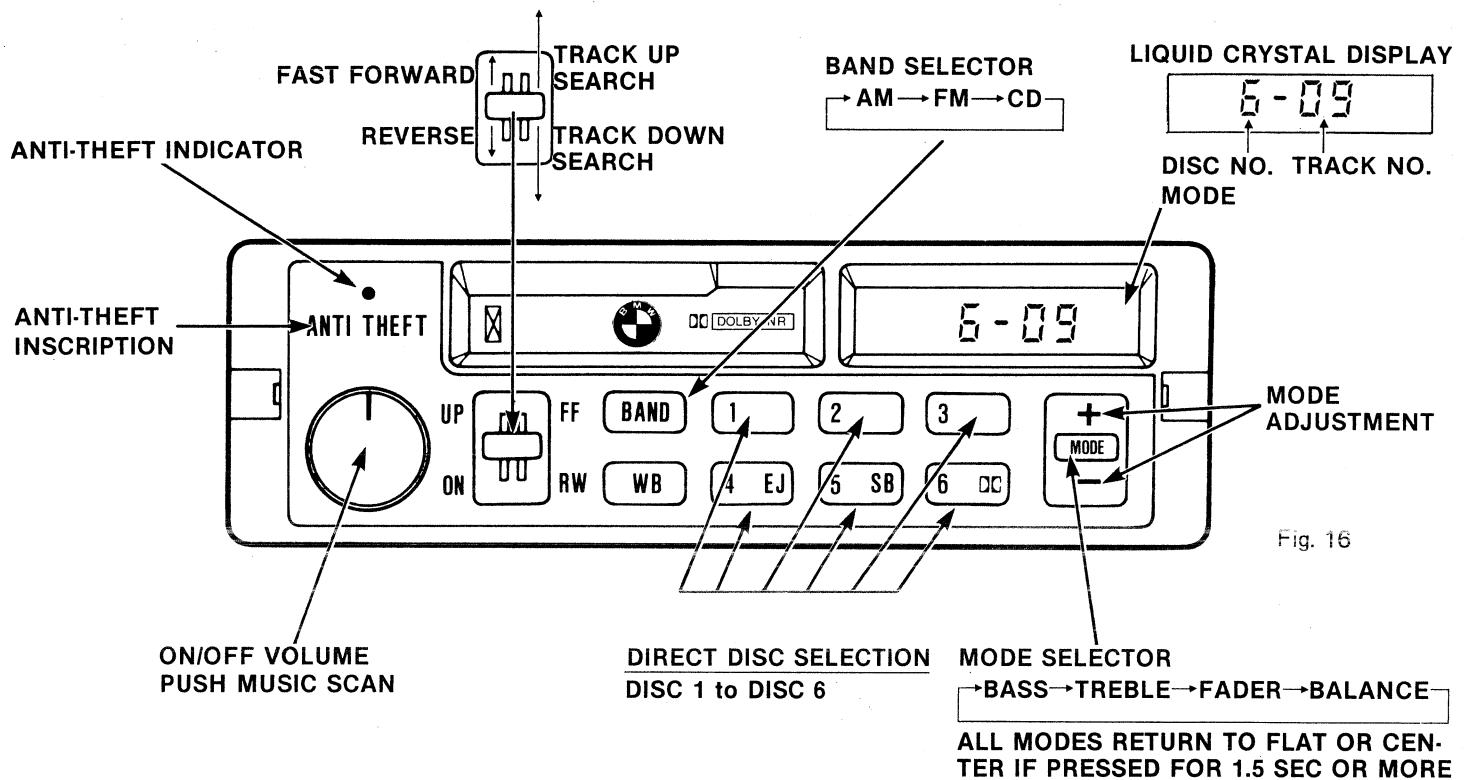


Fig. 16

### CD OPERATION

To use the CD player, turn the radio on and press the **BAND** button. The display indicates AM, FM, or CD. Select CD to switch from radio mode to CD mode.

### DIRECT DISC SELECTION

DIRECT DISC SELECT buttons 1 through 6 correspond to the magazine tray numbers. When there is a disc in a tray, the number lights on the corresponding button. To play a disc in the magazine, press one of the buttons whose indicator is lit.

**NOTE:** Nothing will happen if you press a button whose indicator is not lit.

### FAST FORWARD/REVERSE

The UP/DN lever has a two-step operation. Raise the lever one step to fast forward; lower it one step to reverse.

### TRACK SEARCH

Raising or lowering the UP/DN lever two steps (as far as it can go) activates the track search mode. To advance to the next track, push the lever fully up. To return to the previous track, push the lever fully down. If you hold the lever in the fully up or fully down position, the player moves forward or backward through the tracks continuously.

### MUSIC SCAN

When the ON/OFF button is pressed, the word "SCAN" appears on the display and the player begins playing the first part (approximately 10 seconds) of each track on the current disc. Press the button again when you find a track you want to listen to: the player will return to normal playback and continue with the current track.



# Service Manual

**ORDER NO.  
CRT-468-0**

## **CASSETTE MECHANISM ASSEMBLY**

# **CX-156/A, CX-156/B**

- This service manual is for cassette mechanism assembly used in car stereo components.
- Refer to the service manual for individual models for details on sections other than the cassette mechanism assembly.

Model	Service Manual	Cassette Mechanism Assembly
FX-K5/EW		CX-156/A
FX-K5B/EW	CRT-469	CX-156/A
FX-K5SDK/WG		CX-156/A
FEX-55/US, CA, CS	CRT-471	CX-156/A
FEX-50/ES	CRT-470	CX-156/A
KX-E60/EW	CRT-476	CX-156/B

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TEL: (03) 580-9911

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# 1. REPLACEMENT OF PARTS IN CASSETTE MECHANISM

## • Belt and capstan motor (M3) replacement

1. Remove the four screws and the cover. (Fig. 1)
2. The belt in Fig. 2 can be replaced. (Be sure that the belt is not greased and not twisted.)
3. To replace the capstan motor, remove the two screws shown in Fig. 2.

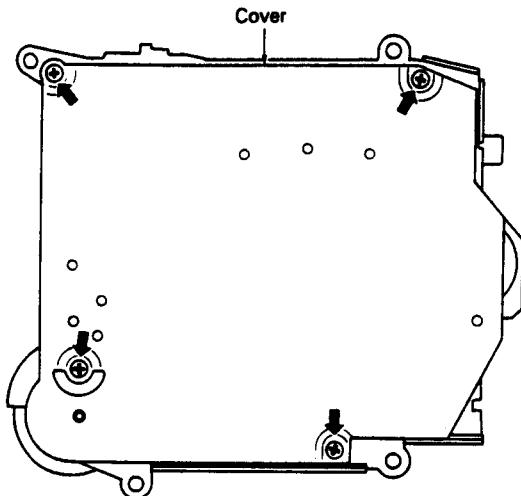


Fig. 1

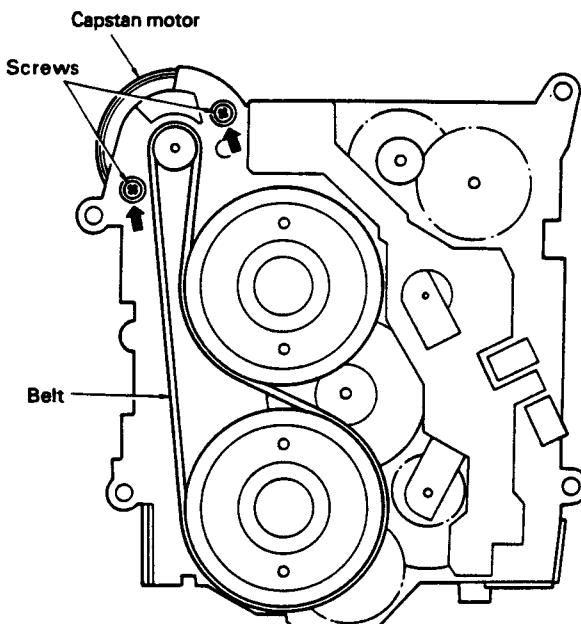


Fig. 2

## • Cassette holder removal

1. Turn the capstan motor until the cassette holder drops down. (Do not turn the flywheel directly by hand.)
2. Remove the screw labeled "B", the collar and the spring.
3. Remove unit "A" and the cassette holder "D" and "E".

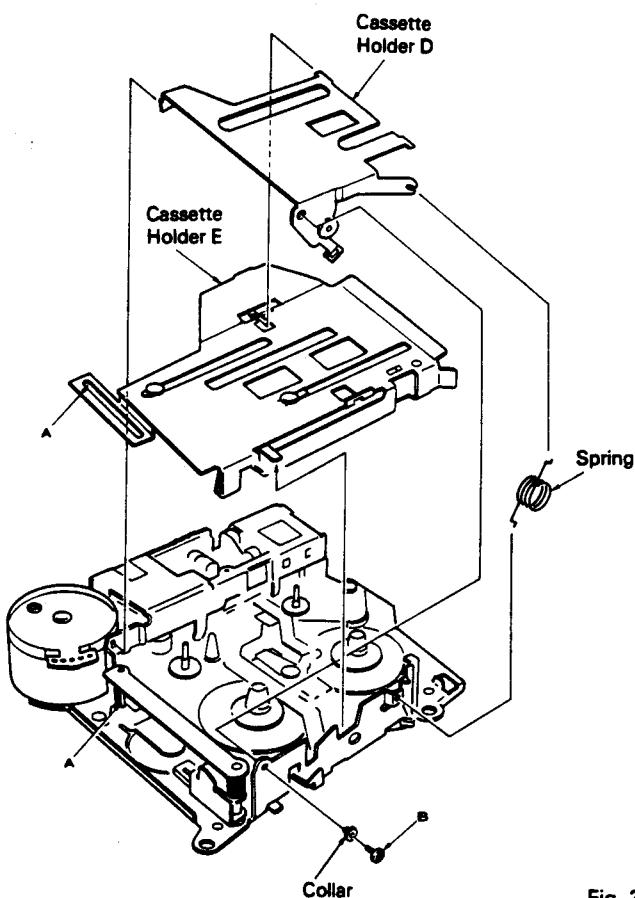


Fig. 3

### • Head unit replacement

1. Remove the washer and spring.
2. Remove the screw labeled "F", and the head unit can be removed in the opposite direction.
3. Be careful of the following point during reassembly.
  - Put the head unit pins through the lever holes. (One in front and one in back.)

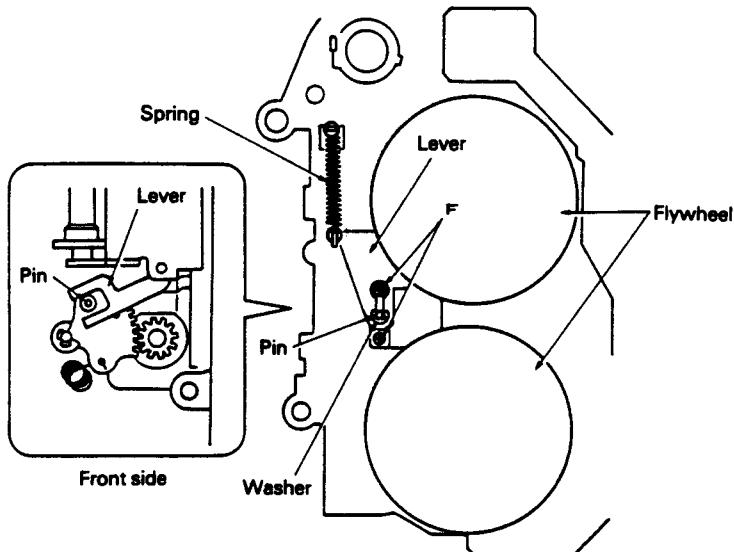


Fig. 4

### • Sub-motor replacement (M1 and M2)

1. Remove the two screws labeled "G" and remove the P.C. board unit.
2. The sub-motor can be removed by removing the three screws indicated by the arrows.
3. Sub-motor 2 (for switching the FF/REW gear) can be replaced when the spacer has been removed. (The motor fits very snugly, so some force must be used to remove it.)
4. Sub-motor 1 (for turning and positioning the head) can be replaced by removing the belt, lock washer, pulley and two screws labeled "J".

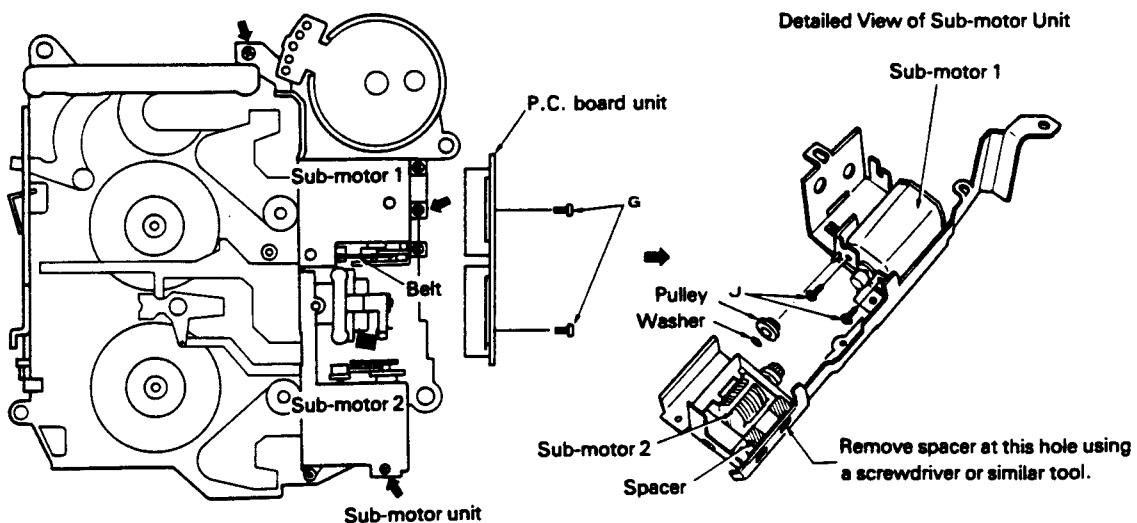
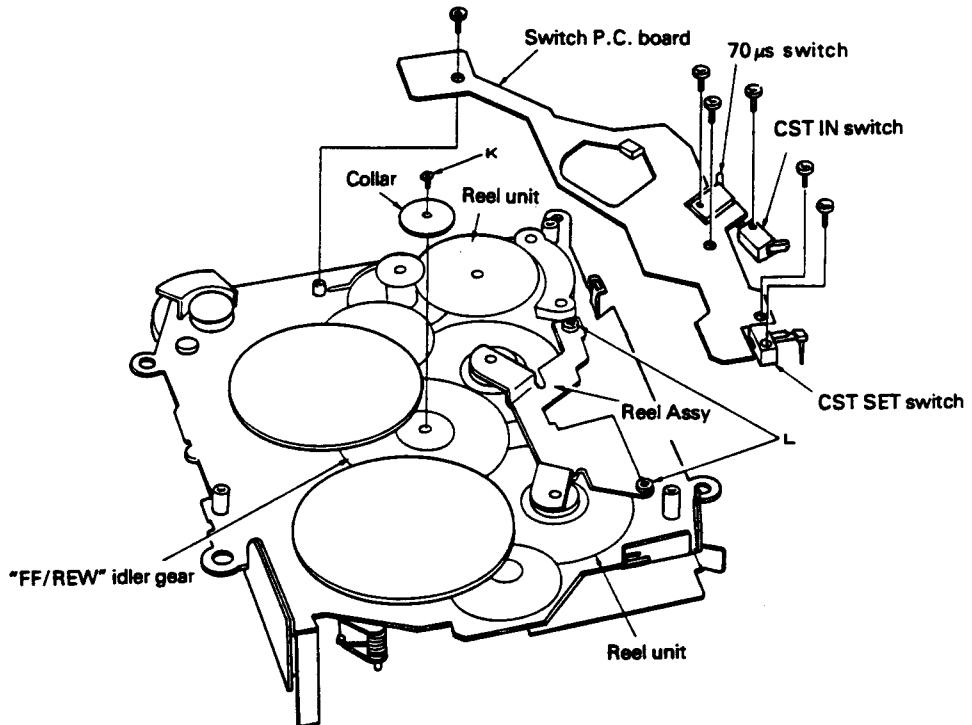


Fig. 5

**• Reel unit replacement**

1. Remove the six screws and the switch P.C. board.
2. Remove the screw labeled "K" and the collar and free the FF/REW idler gear.
3. The reel assy can be replaced by removing the two screws labeled "L" and removing the reel unit.

**Fig. 6**

## 2. MECHANISM DESCRIPTION

Cassette mechanism assy for CX-156/A is used in this mechanism description.

### 1. Outline of Mechanism

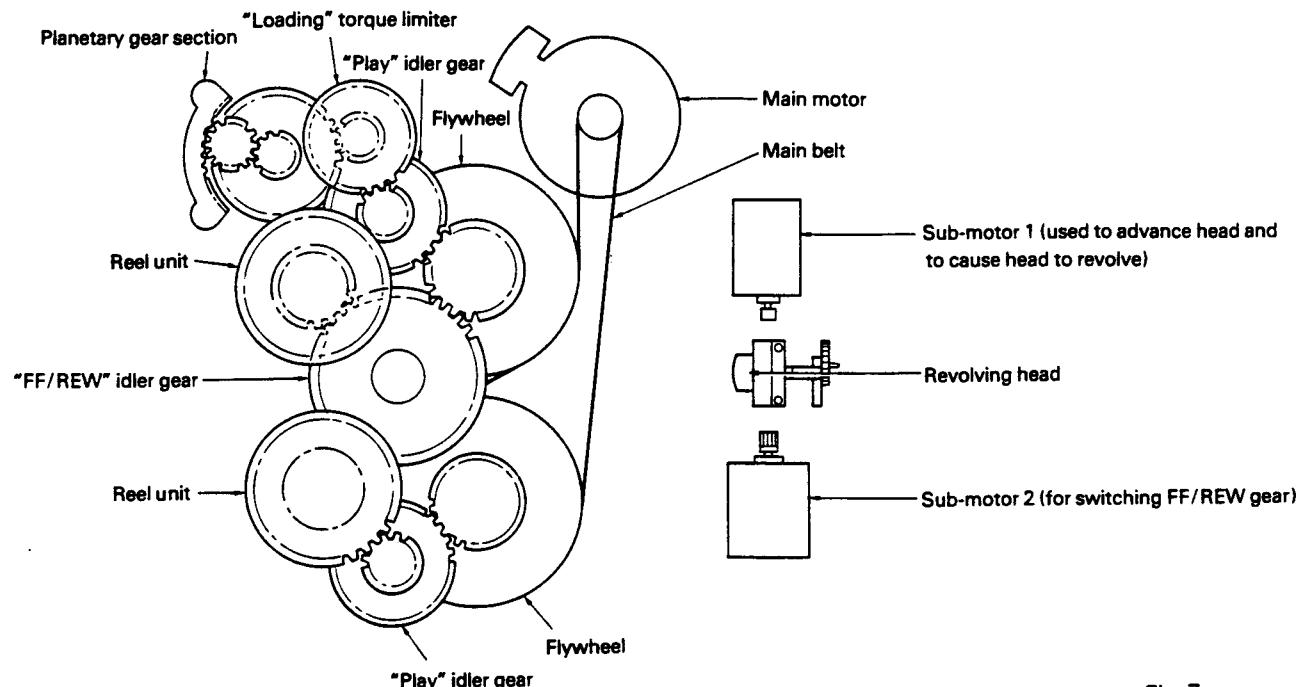


Fig. 7

### 2. Loading/Eject Function

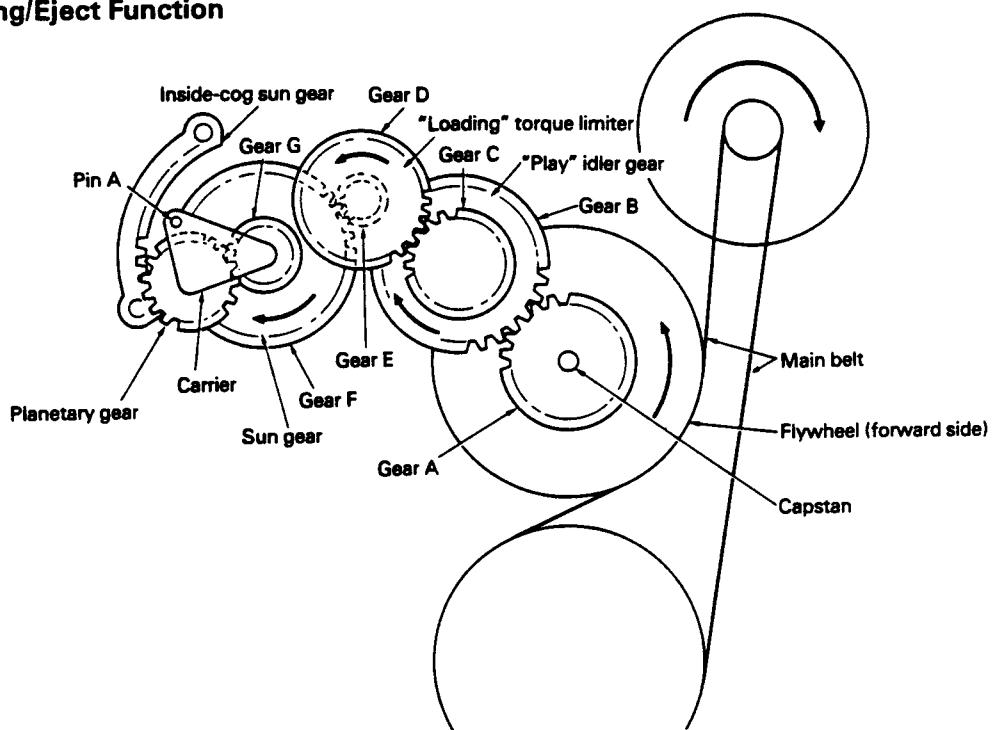


Fig. 8

### 3. Cassette Tape Load and Eject Mechanism

#### • Cassette tape loading operation

1. Push the cassette tape lightly in the direction indicated by the arrow. (As shown in Fig. 10, arm "A" and arm "B" connect to spring "A". These are also connected to common axis shaft "A", which is attached to the chassis surface and acts as a swivel. Pin "A", which is caulked to the planetary gear unit carrier, goes through the chassis and fits into the oblong hole of arm "B". Because pin "A" won't move as long as the capstan motor isn't moving, arm "B" won't move either.)
2. When a cassette tape is loaded, arm "A" moves in the direction indicated by the arrow and spring "A" loosens. Lever "A" also moves in the direction indicated by the arrow, and the catch at left of the lever releases arm "C". Arm "C" then turns counterclockwise and opens the CST IN switch. The capstan motor then begins turning forward.
3. The carrier then moves clockwise because the planetary gear moves along the inside-cog sun gear. Pin "A" which is caulked to the carrier also moves in the same direction. (Fig. 11) The movement of pin "A" is causing arm "B" to move counterclockwise. Arm "A" turns in the same fashion and the "A" unit of lever "A" draws the cassette tape in. (Fig. 9)

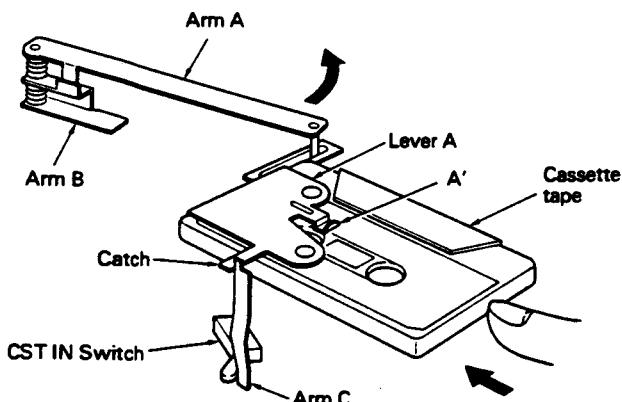


Fig. 9

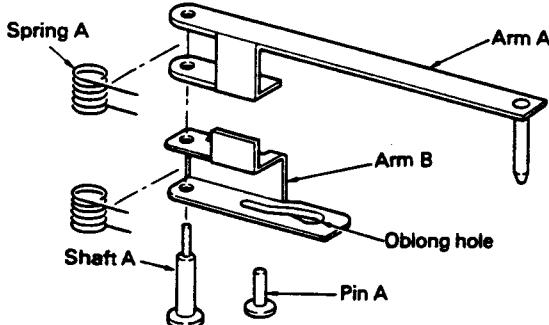


Fig. 10

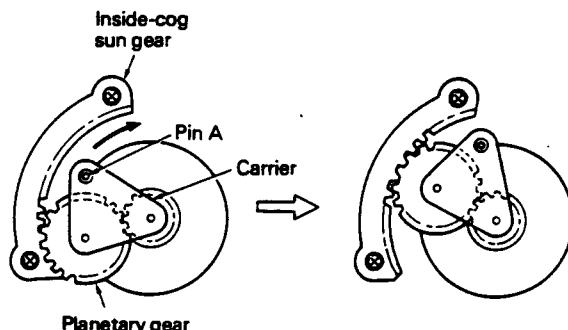


Fig. 11

4. The oblong hole of arm "B" is as shown in Fig. 12. The cassette tape draw-in process will be complete when the pin "A" degree of rotation is  $\theta$ . Arm "B" will not move while the degree of rotation is  $\theta'$ .

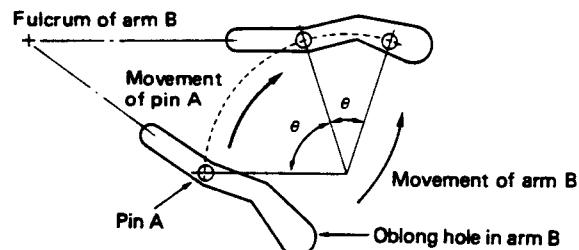


Fig. 12

5. As shown in Fig. 13, arm "C" (caulked to the chassis swivel) is fixed to pin "A" and when the degree of rotation is  $\theta$  arm "C" is stationary, and when it is  $\theta'$  arm "C" turns clockwise.

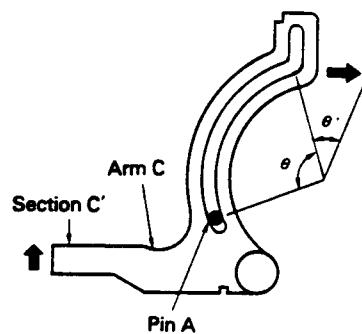


Fig. 13

- As shown in Fig. 14, the "C" unit of arm "C" connects to the cassette arm (which suspends the cassette tape) through spring "C". The arm "C" movement described above in paragraph five makes the "C" unit move in the direction indicated by the arrow in Fig. 14. The cassette arm pushes down holder "A" by means of spring "B". The "C" unit is released when holder "A" drops down.
- In order for the capstan motor to keep turning forward, the planetary gear disengages from the inside-cog sun gear and becomes free.

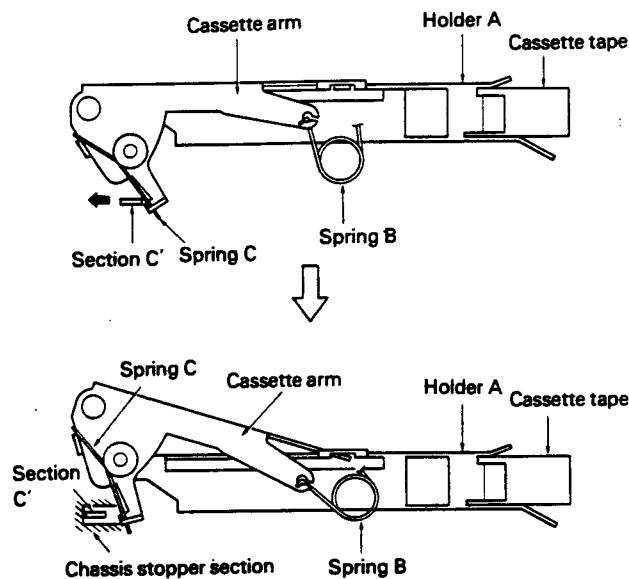


Fig. 14

#### • Eject operation

- Turning on the eject switch reverses the capstan motor. As shown in Fig. 15, spring "D" places slight friction on the planetary gear which causes it to engage with the inside-cog sun gear. The cassette tape is ejected following an operation opposite to the loading operation.

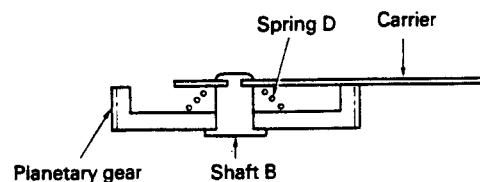


Fig. 15

#### 4. Head Turning and Head Positioning Operations (during forward play)

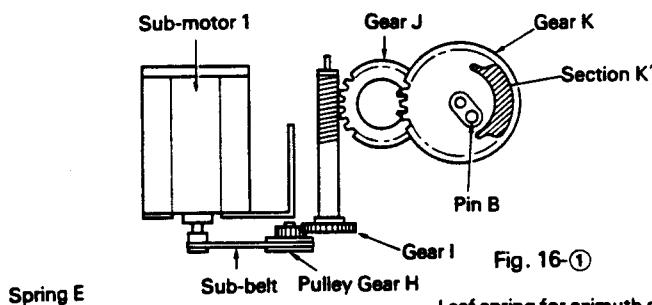


Fig. 16-①

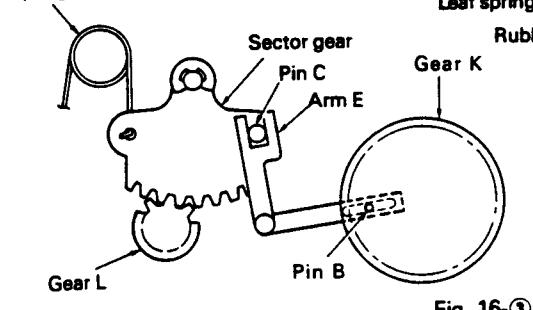


Fig. 16-③

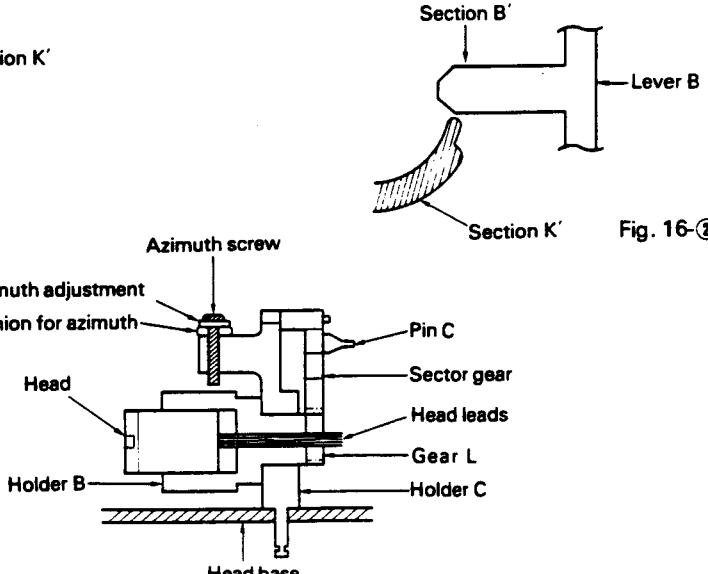


Fig. 16-④

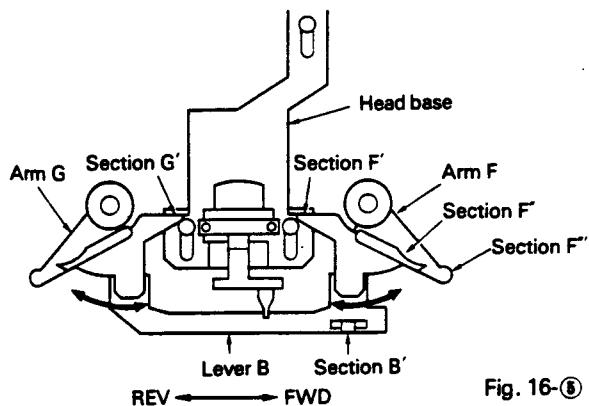


Fig. 16-④

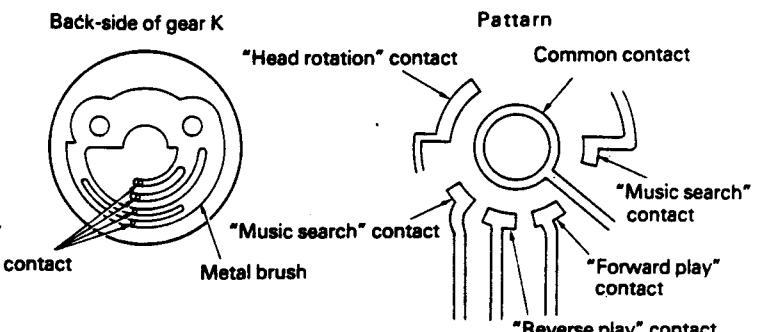


Fig. 16-⑤

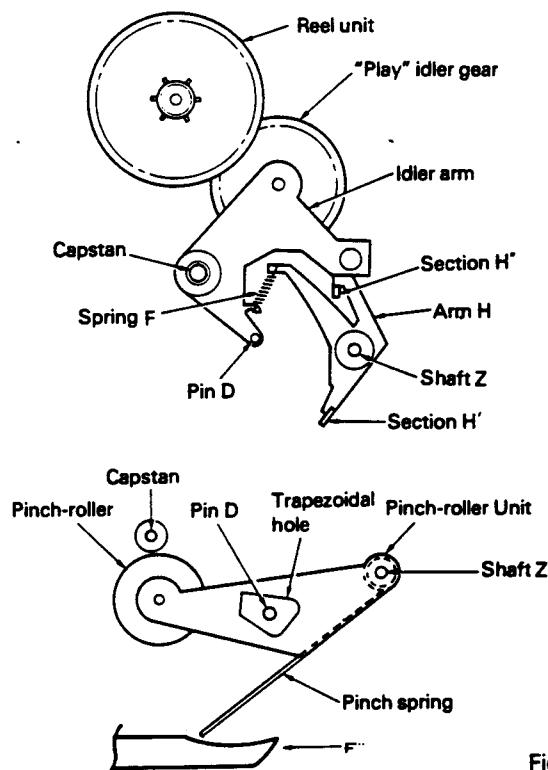


Fig. 17

1. The sub-belt from sub-motor 1 goes through pulley gear "H", gear "I", gear "J" and turns gear "K". Head turning and head base positioning take place using the "K" unit (the projecting unit) of gear "K" and pin "B". There is a metal brush attached to the back of gear "K" which detects the passing through of all patterns and common patterns and stops sub-motor 1. This controls the head positioning, the head turning, the contact pressure of the play idler gear and the contact pressure of the pinch roller.
2. Head turning at pin "B" takes place until gear "K" starts turning which brings the "K" part into contact with the lever "B", "B'' part. (Fig. 16-③)
3. Pin "B" engages with the arm "E" oval opening and rotates arm "E". The arm "E" sector gear is engaged with pin "C" and this turns the head. The head rotation pattern (Fig. 16-④) performs this operation inside a certain angle.
4. When gear "K" turns it also pushes the lever "B", "B'' part. The "B'' part turns arm "F" and arm "G" counter-clockwise and advances head base with the arm "G", "G'' part. (Fig. 16-②, ③)
5. After the head base goes beyond the MS pattern (Fig. 16-④) position, the arm "F", "F'' part pushes the pinch roller unit pinch spring and presses the pinch roller down onto the capstan. (Fig. 17)
6. Simultaneously, the arm "F", "F'' unit pushes the arm "H", "H'' part. The "H'' part lock releases when pushed, and the play idler gear comes into contact with the reel unit. Play operation begins because of this. (Fig. 16-⑤, Fig. 17)
7. When going from play to eject, first, the pinch roller disengages from the capstan, and then using the pinch roller unit trapezoidal hole, releases the idler arm from the reel unit by means of pin "D". After that, the "H'' unit again meshes with the idler arm and the "play" idler gear stops after completely disengaging from the reel unit.

## 5. FF/REW Operation

1. As with the head operations a brush is attached to the back of gear "P" and using patterns and the brush, position sensing takes place and this controls the FF/REW operation.
2. Sub-motor 2 goes through gears "L", "M" and "N" and turns gear "P". When gear "P" turns, arm "I" rotates by means of arm "J". Arm "I" rotates the FF/REW idler gear and engages it with the reel unit.

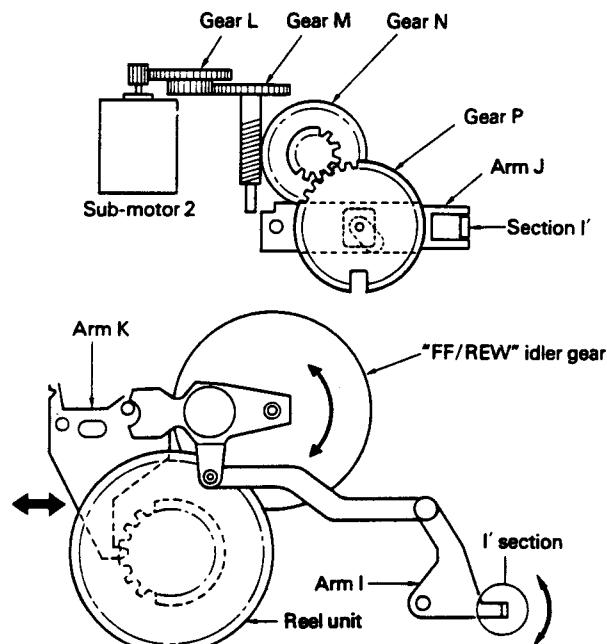


Fig. 18

## 3. ADJUSTMENT

### 3.1 AZIMUTH ADJUSTMENT

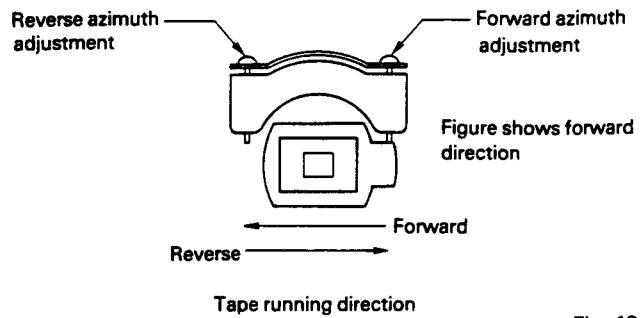


Fig. 19

#### • To Adjust

1. Play "A" side of STD-341A (10kHz, -20dB). Adjust each screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

### 3.2 TAPE SPEED ADJUSTMENT

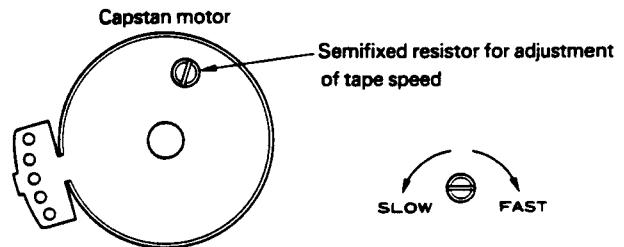


Fig. 20

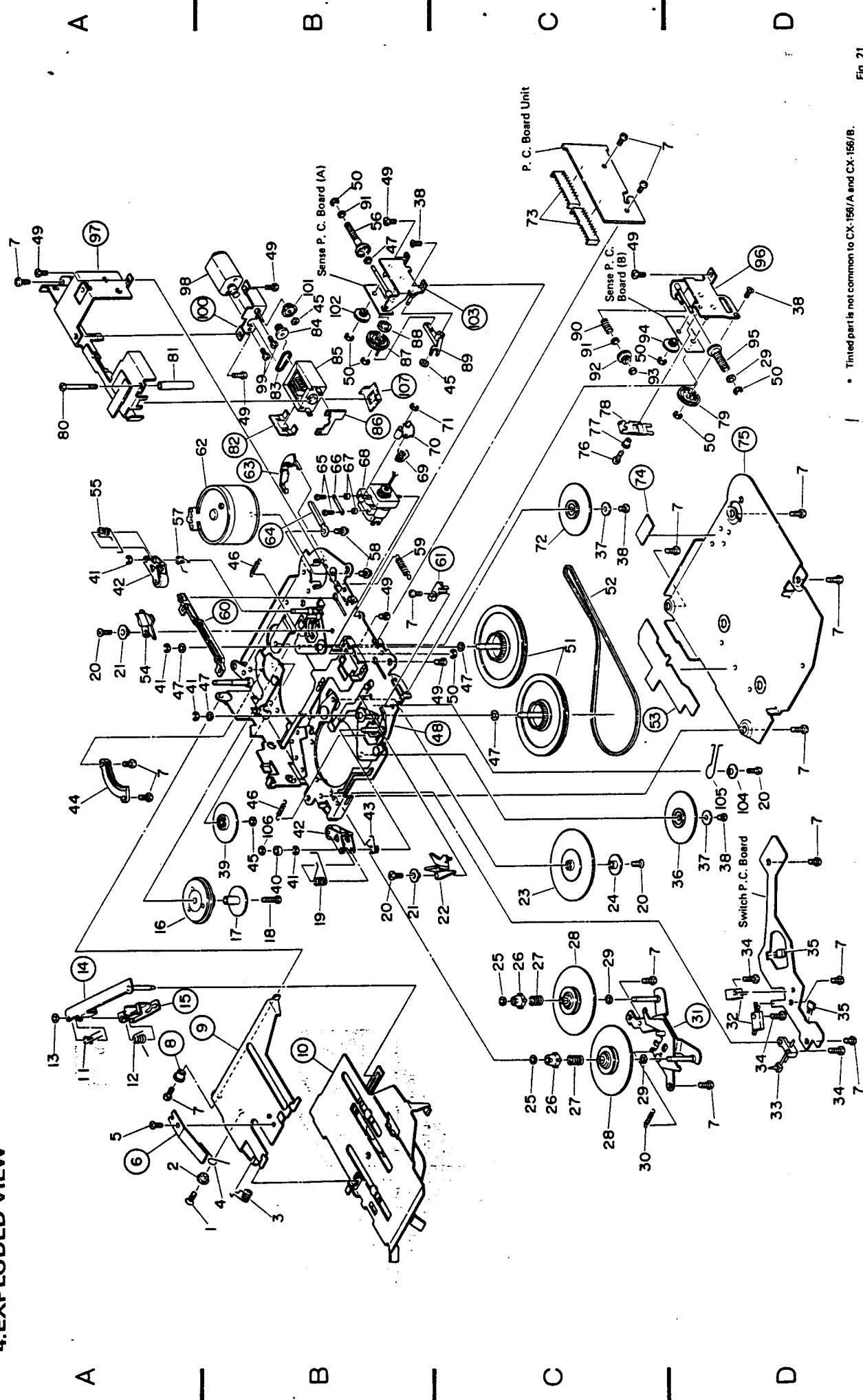
#### • To Adjust

1. Reproduce STD-301 (3kHz, -10dB). Adjust the semifixed resistor so that the frequency counter shows 3,010Hz (+30Hz, -30Hz).

## 3.3 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p><b>■ Tape speed deviation:</b>  <math>3,000 \pm 90 \text{ Hz}</math>  <math>(4.76 \text{ cm/s} \pm 1\%)</math></p> <p>Using an STD-301, measure the speed at the start and end of winding and see that a deviation remains within the limits each time. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>	<p><b>■ Wow and flutter:</b>  Less than 0.15% (WMS)</p> <p>Using an STD-301, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>
<p><b>■ Fast forward and rewinding time:</b>  95~115 seconds</p> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stopwatch.</p>	<p><b>■ Winding torque:</b>  40~60 g·cm</p>  <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 5~6 seconds.</p>	<p><b>■ F.F. torque:</b>  70~110 g·cm</p>  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p><b>■ REW torque:</b>  70~110 g·cm</p>  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p><b>■ Back tension torque:</b>  2.0~3.5 g·cm</p>  <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p><b>■ Cassette loading force:</b>  450~550 g</p> <p>Push the center of the cassette and measure the force with a tension meter (1 kg).</p>

## 4. EXPLODED VIEW





## NOTE:

- For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★: GENERALLY MOVES FASTER THAN ★.
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts whose parts numbers are omitted are subject to being not supplied.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	HBA-193	Screw M1.4×3.5		53.		Insulator
	2.	CLB-691	Collar		54.	CNW-931	Arm
	3.	CBH-837	Spring		55.	CBH-831	Spring
	4.	CBH-867	Spring		56.	CNW-956	Gear
	5.	HBA-147	Screw M1.4×1.4		57.	CBH-833	Spring
	6.		Spring		58.	PMS26P030FMC	Screw
	7.	BMZ20P040FMC	Screw		59.	CBH-830	Spring
	8.		Bush		60.		Lever
	9.		Arm		61.		Spacer
	10.		Holder Unit (CX-156/A)	★★	62.	CXM-161	Motor (Capstan)
			Holder Unit (CX-156/B)		63.		Clamper
	11.	CBH-836	Spring (CX-156/A)		64.		Clamper
		CBH-887	Spring (CX-156/B)		65.	CBA-173	Screw M1.4×8
	12.	CBH-886	Spring		66.	CBE-114	Spring
	13.	CBF-046	Washer		67.	CNY-134	Azimuth Rubber
	14.		Arm Unit	★★	68.	CXD-758	Head Unit
	15.		Arm		69.	CBH-829	Spring
	16.	CXD-388	Gear Unit		70.	CNW-939	Gear
	17.	CLB-617	Collar		71.	YE15FUC	Washer
	18.	CBA-166	Screw M1.7×8		72.	CNW-943	Gear
	19.	CBH-832	Spring		73.	CKS-534	Plug
	20.	HBA-310	Screw M2×3.5		74.		Insulator
	21.	CLB-612	Collar		75.		Cover
	22.	CNW-930	Arm		76.	HBA-158	Screw M1.4×5
	23.	CNW-944	Gear		77.	CLB-750	Collar
	24.	CLB-616	Collar		78.	CNH-004	Arm
	25.	CBF-135	Washer		79.	CNW-953	Gear
	26.	CNW-932	Collar		80.	CBA-165	Screw M2
	27.	CBH-827	Spring		81.	CLB-749	Spacer
★★	28.	CXD-384	Reel Unit		82.		Spacer
	29.	CBF-088	Washer	★★	83.	CNT-114	Belt
	30.	CBH-868	Spring		84.	CNW-941	Gear
	31.		Bracket Unit	★★	85.	CXM-351	Motor (Gear Position)
★★	32.	CSN-091	Switch (70μs, CST IN)		86.		P.C. Board
★★	33.	CSN-089	Switch (CST SET)		87.	CNW-952	Gear
	34.	CBA-172	Screw M1.7×5.5		88.	CNN-481	Spacer
★	35.	SDME106A	Magnetic Resistive Device		89.	CNW-958	Arm
	36.	CNW-943	Gear		90.	CBH-866	Spring
	37.	CLB-615	Collar		91.	HBF-116	Washer
	38.	HBA-209	Screw M2×2		92.	CNW-954	Gear
	39.	CNW-950	Gear		93.	CBF-135	Washer
	40.	CLB-690	Roller		94.	CNY-077	Gear
	41.	EBG-001	Washer		95.	CNY-148	Gear
★★	42.	CXD-387	Pinch Roller Unit		96.		Holder Unit
	43.	CBH-834	Spring		97.		Guide
	44.	CNW-951	Gear	★★	98.	CXM-452	Motor (Head Position)
	45.	CBF-126	Washer		99.	HBA-244	Screw M1.4×1.6
	46.	CBH-835	Spring		100.		Bracket Unit
	47.	HBF-179	Washer		101.	CNY-075	Pulley
	48.		Chassis Unit (CX-156/A)		102.	CNW-955	Gear
			Chassis Unit (CX-156/B)		103.		Holder Unit
	49.	HBA-175	Screw M2×2.5		104.	CLB-760	Collar
	50.	YE12FUC	Washer		105.	CBH-893	Spring
	51.	CNW-942	Flywheel		106.	HBF-180	Washer
★★	52.	CNT-111	Belt		107.		Cover

## 5. CONNECTION DIAGRAM

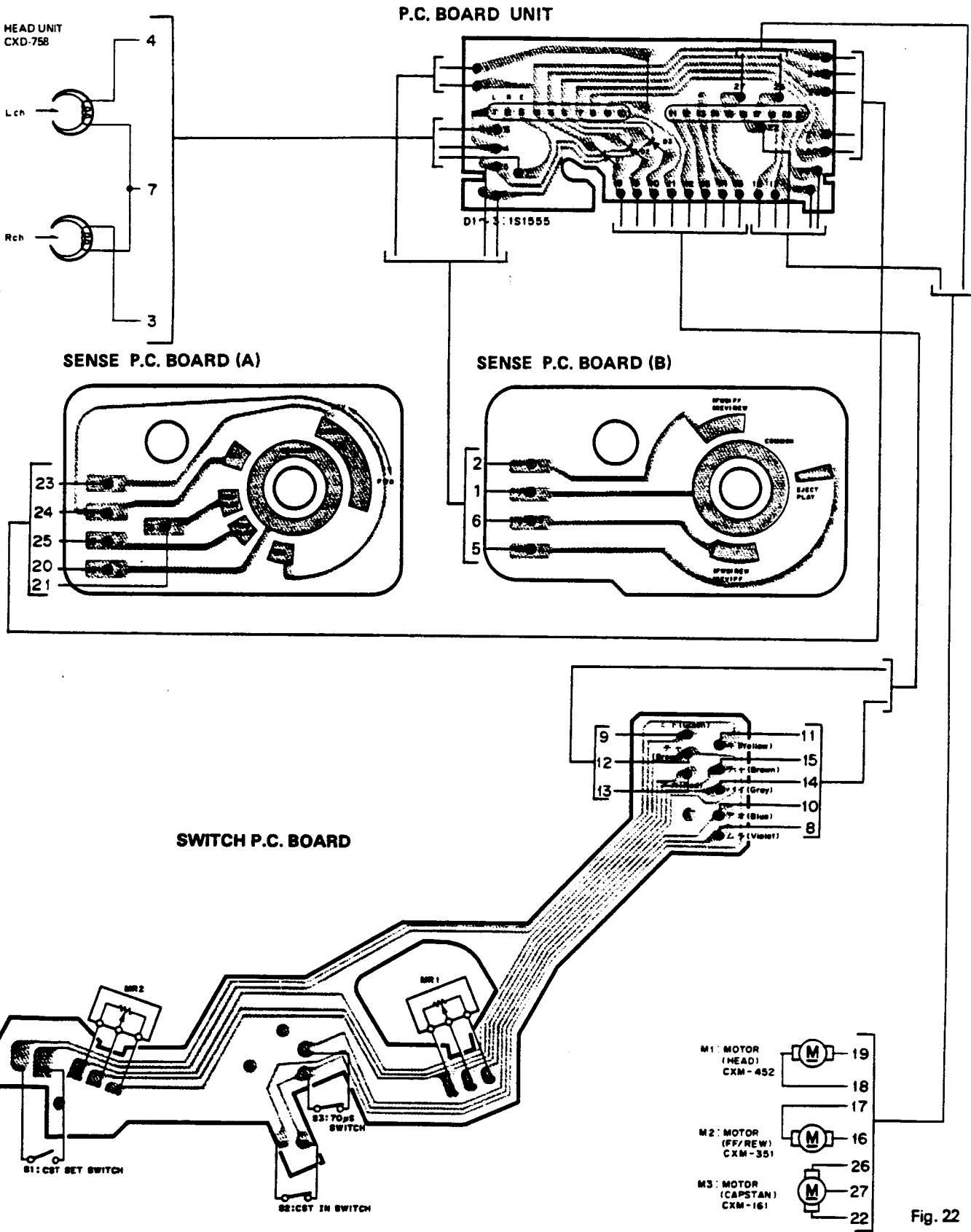
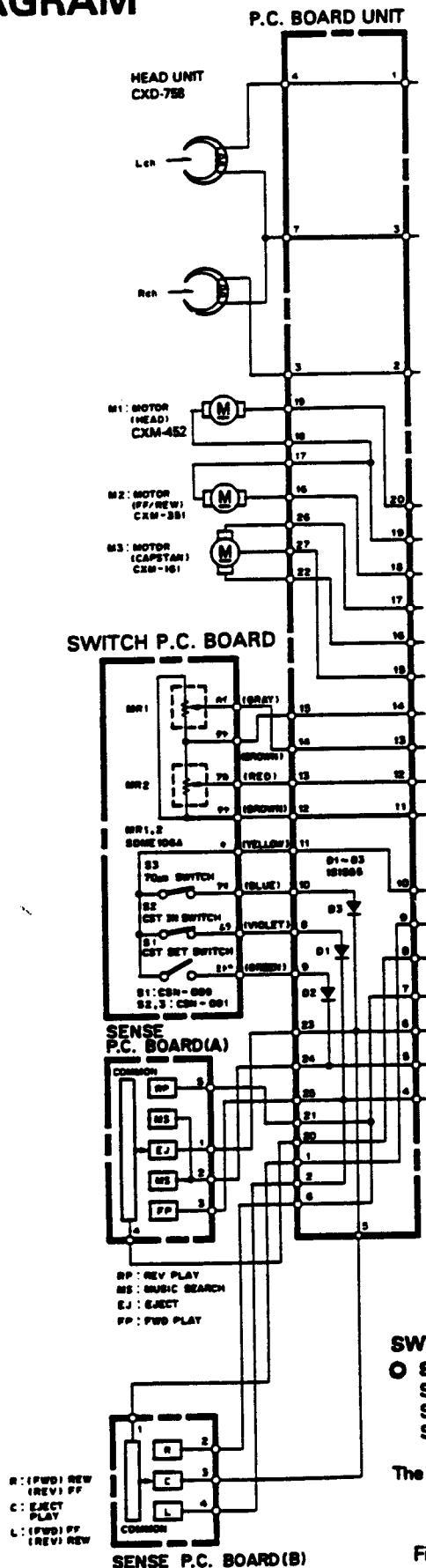


Fig. 22

## 6. SCHEMATIC CIRCUIT DIAGRAM



## 7. ELECTRICAL PARTS LIST

### Switch P.C. Board

Mark	Symbol & Description	Part No.
★ ★	S1      Switch (CST SET)	CSN-089
★ ★	S2, S3      Switch (CST IN, 70μs)	CSN-091
★	MR1, MR2      Magnetic Resistive Device	SDME108A

### P.C. Board Unit

Mark	Symbol & Description	Part No.
★	D1 – D3	1S1565

### Miscellaneous Parts List

Mark	Symbol & Description	Part No.
★ ★	Head Unit	CXD-758
★ ★	M1      Motor (Head)	CXM-452
★ ★	M2      Motor (Gear)	CXM-351
★ ★	M3      Motor (Capstan)	CXM-161

The underlined indicates the switch position.

Fig. 23

### SWITCHES

#### ○ SWITCH P.C. BOARD

S1: CST SET SWITCH.....	ON-OFF
S2: CST IN SWITCH .....	ON-OFF
S3: 70μs SWITCH.....	ON (120μs) – OFF (70μs)